



FRIDAY, JULY 31, 1896.

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Contributions.

Calculating for Floods in Locating Railroads.

NEWTON, Ia., July 21, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the communication of A. A. Allen, page 499, "Running Over a Submerged Track," he says "the Osage River rose to a height unequalled in 25 years." Though he says further on "reaching a flood height never before known," does he mean that knowledge was obtained only from railroad experience, or from the "oldest inhabitant," even though that inhabitant were an Indian?

We used to think it necessary to lay grades above any high water ever reported, even though the "report" was somewhat mystical and traditionary, and never assumed that such height might never again be reached.

In Iowa, for instance, we tried to find out in every case where was "the high water of 1851," even though the information was sometimes mythical. In one instance when this knowledge was supposed to be used, after the road was successfully operated for 13 years, the track was submerged and had to be raised. In that case the trouble arose from one county above the railroad straightening the channel of the stream, which the county below did not do. The instance shows the necessity of co-operation, or beginning at the mouth and working up.

D. H. AINSWORTH.

Treatment of Flange-Worn Rails on Curves.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The importance of careful inspection of curves, the outer rail of which is subjected to much flange wear, cannot be over-estimated, and the manner of treating such curves, so as to get the greatest amount of wear out of the rail is well worth careful consideration.

There are two destructive agencies at work on all curves, assisted by a third, which threaten the safety of traffic, viz:

1. The low rail, by its mechanical action on the ties, cutting into them, and the rail consequently turning outward, thus widening the gage of track. This happens even where the rail is well braced, but to a less extent than when unbraced.

2. Wheel flanges wearing the side of the head of the outer rail of curve, which is more apparent at the center and run off end of curves than on the receiving ends.

3. When the degree of curvature is sufficiently heavy to require the widening of gage when new rails are laid, to accommodate engines having a long, rigid base.

While the latter item remains constant the first and second are ever increasing with time. When these three items sum up to 1 in., making the maximum gage, the curve should have immediate attention. The treatment of such a curve should first be adding the ties under the low rail and turning the latter back to its original position. When the outer rail has worn to such an extent by the wheel flange that the latter is wearing the angle bars, or where the head of rail is worn to near the inside line of the web, produced, or the limit gage of curve has been reached, then this outer rail should either be replaced by a new rail or made to change places with the low; providing, however, that the surface of low rail is still in good condition and does not require to be renewed on that account. When rails are changed in this way double service is got out of both rails. When such curves are on ascending grades for traffic, there is a slight objection to having the narrow-headed rail on the low side of curves, which receives the greatest weight (due to the super-elevation) and the traction power of the engine is diminished, but when this rail is changed before the bearing surface is less than 1 1/4 in., little difficulty has been experienced.

It is a great mistake to spike-in the outer rail, when gage has become too wide by rail wearing, so as to bring

the gage within the limit, for the labor required to do this is great, meaning the changing of rail braces or tie plates, which in a short time must of necessity be again moved back to their original location to accommodate a new rail, or the rail from low side of curve, which has a full head, and to maintain the original gage of curve must occupy the same position as that held by the outer rail when first laid. This extra labor of spiking-in the worn rail means cutting up the ties by such frequent spiking, and is attempting to get additional wear out of rail that is already weakened as much as it should be for safety and economy.

These outer worn rails from curves can be used to good advantage by cutting them up for making guard rails, having one full side of head and being practically of full height, and thus save other rails that would be used for this purpose for use on the main or sidetracks, where they will give better results.

ENGINEER M. OF W.

Railroad Men and the Chicago Platform.

The President of the Cleveland, Cincinnati, Chicago & St. Louis Railway, Mr. M. E. Ingalls, is a Democrat of weight and influence, and naturally reluctant to break party ties. He promptly bolted the Chicago platform and ticket, however, and his reasons for bolting are given in the following interview, published in one of the Cincinnati papers:

"The result of the convention at Chicago is a disappointment to Democrats and a shock to all good citizens in the country. It is Populistic and revolutionary. The most alarming feature in the platform, to all who believe in law and order and a Government under the constitution as the fathers made it, is the attack on the Supreme Court. Many also who remember the Chicago riots of 1894, and the destruction of life and property in its streets, and the prompt action of President Cleveland to suppress this riot and destruction of life and property and maintain the laws, and the opposition of Altgeld to the same, will regret to see in this platform resolutions practically condemning the Presidential action and upholding Altgeld.

"The resolution that no bonds shall be issued to uphold the credit of the country is repudiation, and is on a par with the resolution which was passed in the last days of the Senate, and as dangerous an attack upon the credit and stability of the country as could be made.

"The resolution in favor of the free coinage of silver, if the people should ratify it at the polls, would place this country on a par with Mexico and the South American Republics, and turn back its progress for half a century. It would rob the 10,000,000 of wage-earners in this country of a large portion of their earnings, by paying them in a depreciated currency, for which they would get no corresponding increase in their wages; it being an undoubted fact that in times of cheap money wages never rise in proportion to other things.

"There are 4,875,519 depositors in savings banks in this country, with an average deposit of \$371.36, each of whom deposited good and honest dollars, and this act would oblige them to receive in payment dollars which to-day are worth only 53 per cent. in the market.

"The claim that gold has appreciated, and is the cause of the depression of prices has but little weight with those who look at statistics; the production of gold for the past year being over \$200,000,000, and more than all the gold and silver combined that was produced in any year up to 1894. It is the standard of all nations of the highest civilization. For the conduct of commercial transactions it is used all over the world, and this country cannot change the laws of commerce by its legislative fiat.

"The proposition in the platform that any contract payable in gold in the future should be prevented would debar any of our merchants from transacting business with other countries where gold was the standard.

"The free coinage of silver will produce, temporarily, the worst panic ever known, as it will take from circulation more than \$600,000,000 of gold, which now is used as a basis of credit, and which under free coinage will become merchandise, and will be hoarded or exported. It will take from us all foreign capital, will prevent the development of our industries, and it will be years before we can recover from such a shock. It is a piece of dishonesty, and the American people are not a nation of knaves. It is not Democracy, and no true Democrat who believes in the principles of his party or who loves his country can support the ticket.

"Above all, the people of the South should repudiate this platform; they need credit; they need development; this kills both. They should not allow a lot of superannuated politicians to lead them to moral and financial ruin. This country of ours should be very prosperous. Nature has been kind and we have bountiful crops. Capital is ready to come to us so soon as it is satisfied we are honest. We are suffering from a panic caused and continued by bad legislation and politics.

Mr. T. P. Fowler, President of the New York, Ontario & Western, expressed his views on some of the effects of the action of the Chicago Convention in an interview printed in the New York Sun. This has been reprinted and circulated freely among the employees of the road, and posted on all bulletin boards in the offices, stations and shops along the line. We should suppose that the interview would give the men certain information that they want and would have a good effect. We reprint it below:

"If the silver dollar is worth to-day about fifty-two cents in gold the free and unlimited coinage of silver would almost immediately result in a quotation for gold approximating 200. With a considerable premium on gold a glance through Poor's Manual will convince any one that three-quarters of the railways of this country would either be obliged to default in the payment of interest on bonds or repudiate the payment of such interest in gold. Either course would mean ultimate bankruptcy and ruin.

"By far the largest number of security holders are people of moderate means, widows and orphans, who hold four or five thousand dollars of such securities; wage earners who have invested the savings of years in a single bond. Banking institutions, life insurance and trust companies, are, perhaps, the largest holders of first class gold bonds. Such fiduciary corporations, again, represent thousands of persons who in one way or another are dependent upon the absolute solvency and ability of these institutions to meet promptly all proper demands upon them.

The wage earners, too (and the railway corporations of this country employ hundreds of thousands of men), are or should be vitally concerned in the outcome of this momentous issue. The enforcement of silver money upon railroad corporations, which are obliged, as long as they can, to meet a large proportion of their fixed charges in gold, would mean that wages must be reduced and expenditures curtailed in all directions; that every obligation not expressly payable in gold should be paid in silver, including wages, and in the struggle for existence the burden would fall most heavily upon the small and needy investor and wage earner. There are no more courageous, intelligent or respectable men in the country than those in the service of the operating branch of our railroads.

"During the 10 years that I have been President of this company I have never interfered with or attempted in any manner to control the political preferences of a single one of our employees. I would resent any attempt to control my individual action or interference with my private rights. But at this time the situation demands that all of us who are employees of the Ontario & Western Company, from the highest to the lowest, should stand loyally by those whom we represent and serve. I shall therefore do what I properly may do to place the present issues as I see them, and on the outcome of which depends the welfare and future of this company, squarely before all of those who, like myself, are employed by it. I hope that we may in November next be of one mind and not present a single break in our ranks from New York to Oswego.

"Above this little company's present and future there is a much higher duty, an obligation we all owe to our common country. We must do what we can, every one of us, to protect our country's credit and the national honor of the land we live in and love. This duty is, it seems to me, a solemn trust, and we can only discharge the obligation by laying aside all other considerations and preferences, and by voting ourselves and doing what we can to influence all our associates, friends and acquaintances, regardless of former political affiliations, to vote against anarchy, repudiation and rebellion, and in favor of honor, sound money, McKinley and Hobart."

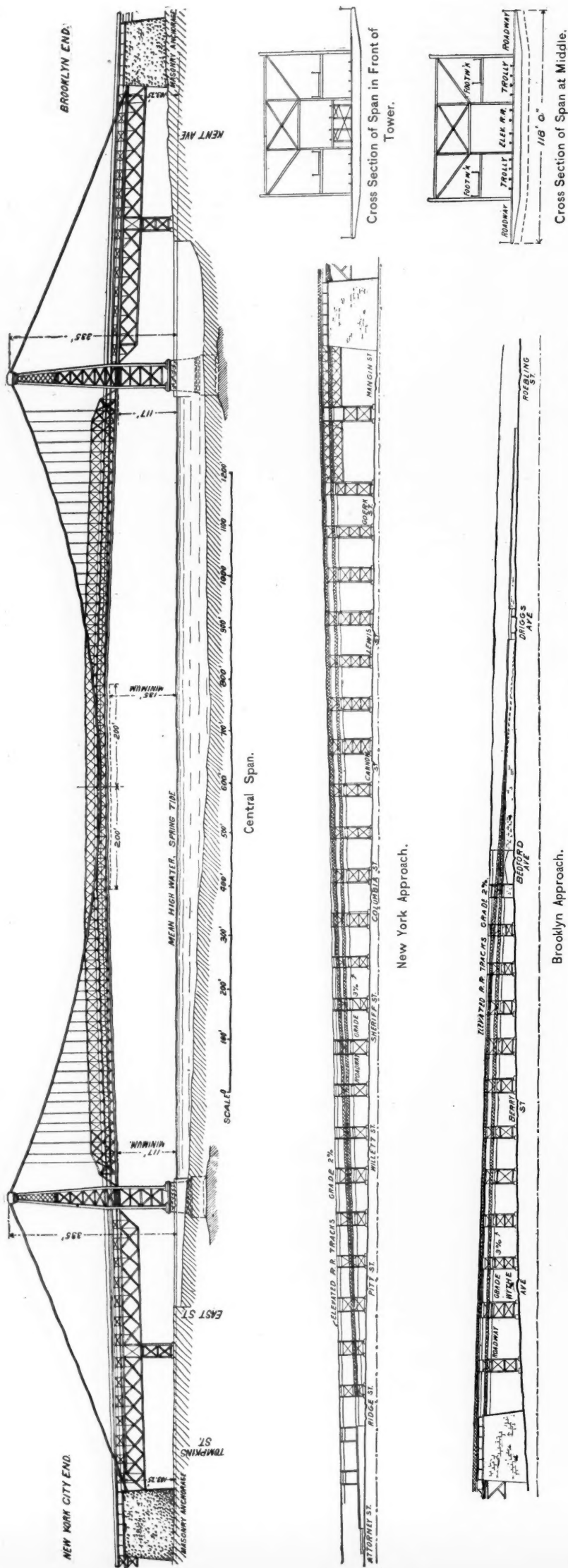
The New East River Bridge at New York.

On July 27, the final plans for the new East River Bridge were filed with the Commissioner of Public Works in New York, and the Commissioner of City Works in Brooklyn. Advertisements will probably be issued within 30 days calling for bids for building the tower foundations.

The apparent delays in filing plans and in the beginning for condemning the property in both cities along the proposed line of the bridge have been necessary, owing to the fact that by a special enactment the Bridge Commissioners were required to file the final plans of the details of construction of the bridge itself, as well as the location of towers, anchorages and approaches in both cities, in fact, all details of the proposed work—before advertisements could be issued, calling for bids for construction work, or condemnation proceedings could be begun. The enactment further stipulates that the plans, after having been filed, are to be irrevocable, thus making it necessary that they should be first brought into as perfect a state of preparation as possible. This it has taken a great deal of time to do, and many changes and corrections have been made. Thus, delays have occurred, which were entirely unavoidable because of the conditions with which the Commission has had to contend.

The plans as now filed provide for a suspension bridge, with steel towers, to extend from Clinton street, between Broome and Delancey streets, in New York, to Roebing street, between South Fourth and South Fifth streets, in Brooklyn. The property which it is proposed to condemn in New York consists of a strip 150 ft. wide, immediately south of and parallel to Delancey street, and extending from Clinton street to the river front, also the two blocks included between Delancey and Broome streets and Clinton and Norfolk streets, which are to be turned into a plaza for the bridge approach. The bridge will be 118 ft. wide, and its northern line will coincide with the southern boundary of Delancey street; thus a safety margin of 32 ft. will be left on the south side of the bridge, and Delancey street, which is 50 ft. wide, will make a margin on the north. The plan for the Brooklyn end is to run the bridge from the river, between South Fifth and South Sixth streets, to a point between Berry street and Bedford avenue, where it will make a double turn, crossing over South Fifth street, and then continue in its former direction to Roebing street, where the approach will be located. This plan for curving the bridge is, however, merely tentative. It was adopted because if a straight line were followed to the approach, the effect would be to close South Fifth street for a short distance, a proceeding for which the Commission has no legal right. But application is to be made to the Legislature, as soon as possible, for permission to encroach upon South Fifth street to the amount necessary for making the line of the bridge perfectly straight from end to end, the plan being to deflect that street to the north, along the side of the bridge, to the approach, where it will open into the plaza. In case of the final adoption of either of these two plans, the plaza for the approach will occupy the four blocks included between Broadway and South Fourth street, and Driggs avenue and Havemeyer street.

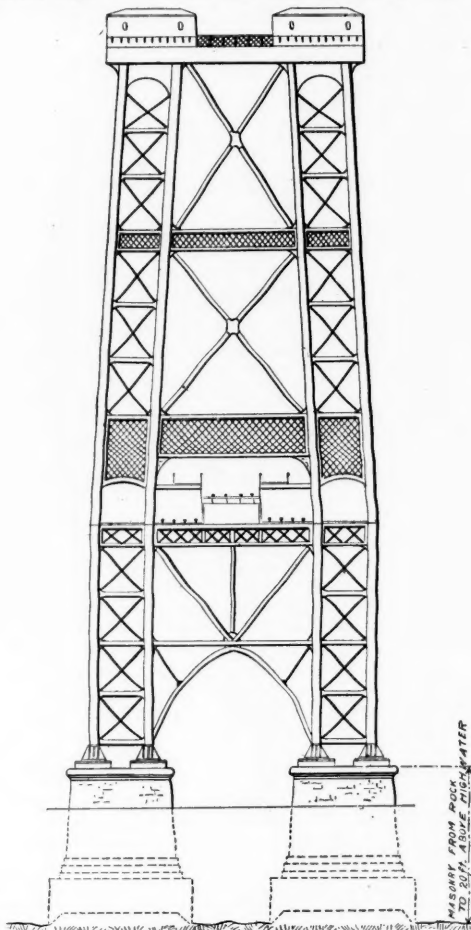
The bridge will be 7,200 ft. long and 118 ft. wide; the towers will be 335 ft. in height, from high water to the centers of the cables, and the middle of the span will be 135 ft. above maximum high water. The length of the span, between centers of the towers, will be 1,600 ft., the length of the New York approach will be 3,150 ft., and of the Brooklyn approach, 2,450 ft. The towers will be of steel, and their masonry foundations will be in two parts; those for the New York tower will be placed one on each side of Pier 58; for the Brooklyn tower, they will both be located in the slip between the South Fifth and South Sixth street piers.



The preliminary borings which have been made show that rock on the New York side is 60 ft. below high water, and covered by 40 ft. of sand and boulders. On the Brooklyn side, the rock was found to slant considerably, being 90 ft. below high water for the north foundation, and 86 ft. below for the other; it is covered with a layer of compact blue clay, above that being, as on the other side of the river, 40 ft. of sand and boulders. The rock on both sides of the river was found to be an excellent quality of gneiss.

Each half of each foundation will cover an area of 60 x 75 ft., thus making the total bearing surface for each tower about 9,000 sq. ft., which is very small in comparison with that of the New York and Brooklyn Bridge, necessitated by its enormously heavy masonry towers.

The anchorages will each measure 160 ft. in width by 150 ft. in length, and will be built to a height of 103 ft. above high water. The New York anchorage will be



Front Elevation of Tower.

between Tompkins and Mangin streets, and that in Brooklyn between Kent and Worth avenues. In each case the distance from the center of the tower to the face of the anchorage will be 575 ft.

Other general particulars relating to the bridge are : Minimum height above mean high water of spring tides at pier-head lines, 117 ft.; height of masonry of tower foundations above high water, 20 ft.; width of carriage-ways, each 18 ft.; width of two foot-walks, each 12 ft.; width of four trolley car tracks, center to center, 10 ft. and of two elevated railroad tracks, center to center, 12 ft. Distance apart, from center to center, of the two stiffening trusses between towers, 72 ft.; grade of approaches, 3 per cent.; grade of elevated railroad tracks, 2 per cent. The entire suspended structure, except flooring, will be of steel, also the cable fastenings. The cables will be of straight steel wire, No. 6, Birmingham gage.

Railroad Statistics for the United States to June 30, 1895.

The Statistician of the Interstate Commerce Commission has given to the newspapers the principal totals of his eighth annual report, which is for the year ending June 30, 1895. Those items which are of interest to our readers appear in the table below. The similar report for the preceding year was published in the *Railroad Gazette* of June 21, 1895, and some additional matter, given out later, appeared in our issue of Nov. 1.

In the present report it will be observed that the number of freight cars owned by the railroads was about 9,000 less in 1895 than in 1894. The Statistician believes that this decrease is deceptive; he believes that the use of freight cars owned by outside parties has increased, so that possibly the total number of freight cars in service was not less than in 1894.

	1895.	1894.
Miles of railroad completed.....	180,657	178,768
Increase in 12 months.....	1,919	2,247
Miles of track.....	238,894	233,533
Number of corporations.....	1,965	1,954
in hands of Receivers.....	37,815	40,818
Locomotives.....	33,699	35,492
Cars, passenger.....	33,112	33,018
freight.....	1,196,119	1,205,169
total.....	1,270,561	1,278,078

GENERAL PLAN OF THE SUSPENSION BRIDGE TO BE BUILT OVER THE EAST RIVER BETWEEN THE CITIES OF BROOKLYN AND NEW YORK.

MR. L. L. BUCK, M. Am. Soc. C. E., Chief Engineer.

	1895.	1894.
Cars and engines with power brakes.....	362,198	339,992
" " with automatic couplers.....	408,856	357,621
Employees.....	785,034	779,608
per 100 miles of line in M. W. de-		
partment.....	128	123
Ditto, maintenance of equipment.....	88	86
Capital stock, common (millions).....	\$4,201.7	\$4,103.6
" " preferred.....	759.6	730.5
" " total.....	4,961.3	4,834.1
Funded debt (millions).....	5,407.1	5,356.6
Current liabilities (millions).....	616.8	605.8
Dividends paid during year (millions).....	85.3	91.6
Percentage of stock receiving no dividends.....	70.0	63.4
Percentage of bonds receiving no interest.....	13.4	14.2
Average rate dividend on dividend-paying		
stock.....	5.74	5.41
Gross earnings, year, passenger (millions).....	\$252.2	\$285.3
" " freight.....	730.0	690.5
" " total.....	1,075.4	1,073.4
Operating expenses (millions).....	725.7	731.4
Per cent. of expenses to earnings.....	67.48	68.14
Net earnings (millions).....	\$349.7	\$342.0
Other income.....	132.4	142.8
Fixed charges etc (millions).....	426.0	429.0
Net, available for dividends (millions).....	56.1	55.8
Gross earnings per mile of road.....	\$8,050	\$6,109
Passengers carried (millions).....	507.4	510.7
one mile (millions).....	12,188.4	11,289.4
Freight carried.....	696.8	638.2
one mile.....	85,227.5	80,335.1
Ton-miles per freight locomotive.....	4,258,871	4,016,755
Passenger-miles per passenger locomotive.....	1,218,967	1,444,400
cars per 1 million passengers.....	65	53
Employees killed.....	1,811	1,823
injured.....	25,696	23,422
Passengers killed.....	179	324
injured.....	2,375	3,034

* The number of passengers killed in train accidents, according to the monthly records published in the *Railroad Gazette*, was 44.

In concluding his report the Statistician renews his recommendations that reports be required from express companies engaged in interstate traffic, from all corporations, companies or persons owning rolling stock which is used in interstate commerce, as also all corporations, companies or persons owning depot property, stock yards, elevators and the like, and from all carriers by water whose business influences interstate traffic; also that Congress be requested to provide for a bureau of statistics and accounts, which shall have the right of inspection and control over the accounting departments of the common carriers.

Freight Yard at Dresden, Germany.

A German correspondent has sent us a photograph, which is reproduced herewith (Fig. 1), showing the appearance of the sand track for stopping runaway cars, which was recently described in the *Railroad Gazette*. In connection with this he sends a general view of the yard, which is shown in Fig. 2. This will be of interest as affording a glimpse of German railroad "scenery," though it is not perhaps of special technical value, except that it shows how prodigal they are with land over there and how freely electric lights are supplied for illuminating the yards at night. All of the tall masts shown in the picture are supports for arc lamps. Another curiosity (shown in Fig. 1) is the switch lamp or lantern, which evidently is a form signal, the movement of the switch to the position opposite to that shown in the engraving having the effect of presenting a diagonal bar of light to the approaching engine man or brakeman.

The principal railroads centering in Dresden were consolidated under the government of Saxony a few years ago and the consolidation of the freight business of the different roads which followed necessitated the establishment of a large yard. This yard, which is in that part of the city called Friedrichstadt, is about 8,200 ft. long, and by making an artificial grade at one end, grades of about one per cent. have been established for the purpose of switching cars by gravity. The construction of this grade necessitated the removal of about 1,962,000 cu. yds. of earth. The tracks in the yard, for trains completely made up, are about 2,000 ft. long, that being

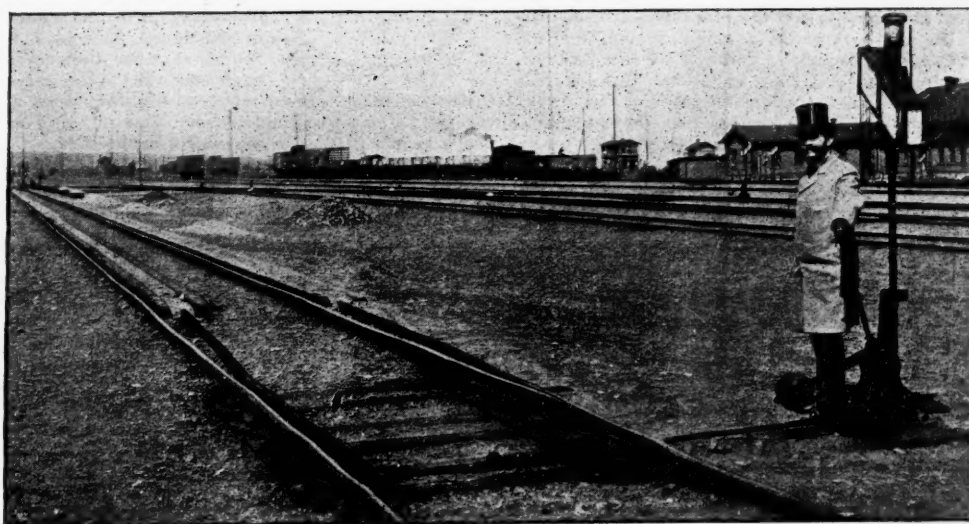


Freight Yard at Dresden, Germany.

the maximum length of freight trains in that country. The gridiron tracks for assorting cars are arranged in two groups, one of eight tracks and the other, farther down the grade, of four tracks, so that a train with cars for 32 different destinations can be sorted without pulling any car up hill. This is the place where gravity switching was first done in Germany, though since then the practice has been adopted at other places. It appears that the sand track is used not only in emergencies, but in every-day work for the purpose of slackening the speed of cars on approaching the switch track to which they are destined.

The construction of the sand track is very simple. Stringers are spiked to the ties parallel to the rails, making a trough for the latter, which is filled in with

sand, and the depth of this sand above the top of the rail regulates the degree to which the speed of the cars will be reduced on running through it. It is found possible in practice to regulate the depth of sand very nicely so as to conform to the necessities of each case. The sorting-tracks having a down grade of 1 in 100, to secure proper motion of cars even under the most unfavorable conditions, such as head winds, side winds, snow, etc., it might happen that in good weather or with a wind from the rear, the cars would run too fast for convenience or safety, especially if easy runners and heavily loaded. As the ordinary brake-blocks or wedges act on only one axle of each car, it would take too great a distance for the annihilation of the momentum of such cars by these wheel-brakes. But this necessary work is very effectually done by covering a length of track (suf-



Sand Track for Stopping Runaway Cars, Dresden, Germany.

ficient to effect the purpose under the conditions governing at the time) with a sand-layer about 1½ in. thick.

Although the length of this sand-track may be adapted to almost stopping merely one car at a time, there are still to be considered the groups of cars, which require some retardation. For these there is arranged a second sand-track, below or beyond the other, into which groups of cars are diverted by a switch.

As an example of the easily variable amounts necessary to meet varying conditions: On March 23 of this year the first sand-covering, to be passed by all single cars, as well as groups, had a length of 23 meters (75.5 feet), and the second one, for all groups of more than two cars, 14 meters, say 46 feet. On another occasion, when a strong wind was blowing from the rear, it was necessary to cover with sand not only the whole length of the first sand-track (41 meters = 134.5 feet) but the entire second track also; 21 meters = 69 feet.

The entire length of single track in this great yard is 67 kilometers = 42 miles. There are 283 switches. The yard is lighted by about 100 arc lamps of 1,500 candle-power (20 amperes, 30 volts) each.

The employment of gravity for shifting freight cars has been most economical. Formerly the 2,000 cars which passed Dresden for other destinations were held on the average 21 hours before leaving. Now they remain but 5 hours; there are thus saved by concentration of the shifting work formerly done in four different places, and by improved methods, 16 hours per car. The saving is therefore practically equal to adding 16 × 2,000

Cumberland, was tied up two days by washouts between Wheeling and Grafton. The Parkersburg Branch, between Grafton and Parkersburg, was for two days unable to run trains except by transferring. The Roaring Creek & Charleston, from the West Virginia Central, and Pittsburg road, down the Roaring Creek valley, lost six bridges and trestles, and the roadbed was washed badly. The Dry Park Railroad, a branch of the West Virginia Central & Pittsburg, had culverts and bridges washed out. The Grafton & Belington, a short line connecting the Baltimore & Ohio with the West Virginia Central & Pittsburg lost two bridges. The Monongahela River Railroad, from Fairmont to Clarksburg, was severely damaged, passengers and mail having to be transferred by boat, on account of a big break in the roadbed. The West Virginia & Pittsburgh

Railroad was also damaged, the tracks being covered for miles with rubbish.

The railroads were just beginning to get into shape again, when on Friday, the 24th, the second storm of the week began. It covered the same ground as the first, except that it was more extensive, and reached from Noble County, Ohio, to Cumberland, Md., on the east, and Pittsburgh at the west, reaching below the Little Kanawha River at the south. By noon on Friday there was a thousand miles of railroad track in West Virginia practically impassable. All trains on the main line of the Baltimore & Ohio from Wheeling to Cumberland, and from Grafton to Parkersburg, were abandoned. A landslide between Wheeling and Fairmont tied up that part of the road, while the entire line from Wheeling to Cumberland was rendered useless by landslides, washouts, culverts, weakened bridges and flooded tracks. On the Parkersburg line, the bridge at West Union, Doddridge County, gave way and closed all communication, while there were cave-ins at tunnels near Parkersburg.

The main line of the Baltimore & Ohio was opened on Monday morning and the Parkersburg Branch Monday evening.

The Ohio River Railroad was blocked until Saturday noon. At one point for nearly a mile the track was covered 10 ft. deep. The West Virginia Central & Pittsburgh, which had made but little progress toward recovery from Tuesday's storm, was again closed completely. The track for miles was covered with water from 6 to 10 ft., but trains were run through on Sunday. The Roaring Creek & Charleston road in the second storm lost several more bridges and trestles.

In the second storm the Grafton & Belington lost several bridges and trestles and the roadbed was washed in many places. The road was able to run trains through Monday night. The second storm was disastrous to the West Virginia & Pittsburgh and Monongahela River roads. Both roads were doing business on Monday in a limited way.

The Bellaire, Zanesville & Cincinnati Railroad lost six bridges and the roadbed was washed away in several places. The Cleveland & Marietta Railroad suffered at points in Noble and Monroe counties, Ohio.

Accounting Officers' Annual Meeting.

The Secretary of the Association of American Railway Accounting Officers has issued the report of the eighth annual meeting, which was held in New York City May 27 and 28. The principal subjects dealt with at this meeting were reported in the *Railroad Gazette* of May 22, page 366.

The Executive Committee was authorized to recommend to the Interstate Commerce Commission a form for a general balance sheet for page 25 of the Interstate Commerce Commission's form of annual report. No action was taken looking to a uniform freight bill, nor on the proposition to formulate a set of general railroad accounts. The recommendation of the Freight Committee that jute manilla paper should be used for interline way bills and that copies of all documents pertaining to interline freight account settlements should be made on hard paper, was adopted. The recommendation of the Passenger Committee concerning C. O. D. baggage

+ 24 = 1,333 cars per day to the total number available for traffic.

Floods in West Virginia.

The upper part of West Virginia has been visited twice within the past week by the most violent and destructive rain storms ever known in that region. On Tuesday of last week a rain storm passed over the northern counties, doing much damage to railroads. The Ohio River road, for the seventh time within a month, was completely tied up by washouts along the upper part of the line between Parkersburg and Wheeling. The line was opened on Wednesday. The main line of the Baltimore & Ohio, between Wheeling and

re-shipped was laid on the table. The recommendation of Mr. J. L. Graham, of the Central of Georgia, that in settling freight claims each road should remit direct to the company which pays the claim was rejected, a vote by roads standing 30 to 42.

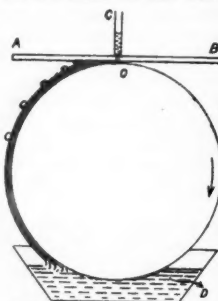
The standard waybill of the Association has now been adopted by 91 roads which are members of the Association and by some outside. This waybill is shown herewith. Our engraving is somewhat more than half as large as the original, the size of the form being 8½ x 14 in. The Association's standard waybill for use on roads which make junction settlements differs slightly from the form here shown; it has a number of spaces to show division of earnings and to enable junction agents to make settlements between themselves. The spaces for junction agents' stamps at the bottom of the sheet are reduced in number to give room for this additional matter. The meeting received a communication from Mr. E. P. Campbell, Auditor of Traffic of the Erie Railroad, suggesting various changes in the waybill form. His letter was referred to the Standing Freight Committee. Mr. Campbell also recommended that the Association adopt a standard form of card waybill.

Addresses were delivered at the meeting by Mr. S. Chapman on "Railroad Clearing Houses" and by Mr. Charlton Messick on "Train-Checking."

Mr. Chapman's paper is a description of various fea-

gase connected by a very small hole to the center of the bearing surface.

We reproduce a cut showing the way in which oil lubricates a bearing. If oil is slowly poured on a revolving shaft it accumulates in a thick ring, the oil next to the shaft adhering more firmly to it than that which is further away. The same fact is observed when a shaft rotates in a bath of oil, as will be seen from the diagram. D represents a bath of oil in which a shaft rotates in the direction indicated by the arrow. A plate A B rests upon the shaft at O, and a tube O C is inserted in the manner shown in the figure. This tube is full of oil all the time and a gage connected to the end of it indicates the pressure to which the oil is subjected at the point O of the bearing surface. This follows from the principle that a pressure on a confined liquid is transmitted equally to all parts of it. Unless the plate entirely stops all the oil from passing around with the shaft it must float upon that part of it which remains between the two. That is,



Mr. Dewrance closes his paper by suggesting that new channels of thought and experiment should be added to this important subject. We might add that the conditions are different in the ease of the lubrication of car

loay should be used until it is demonstrated satisfactorily that its point of first yield is considerably above the greatest load or shock to which it will be subjected in use. The more important bearings are divided by him into three classes:

In the first is included the ordinary mill-bearing or plumber-block used to support shafting. Oil is fed into the center of the top bearing at the point which must sustain the least load, which, in this class, is the best place to apply the oil. In the second class are included the bearings of vertical engines. The oil is generally applied at the center of the top bearing, whereas the proper point to introduce the oil is just above the point of bearing at the side. There the oil is distributed over the shaft and carried to the point of greatest pressure. In the third class are included the bearings of horizontal engines, especially those in which the main bearing is next to the connecting rod. The oil is introduced at the top at the point of least pressure, but before it arrives at the first point of greatest pressure it has to jump one of the four joints of the section of the bearing into which it is divided. These bearings have proved to be very troublesome.

Mr. Dewrance closes his paper by suggesting that new channels of thought and experiment should be added to this important subject. We might add that the conditions are different in the ease of the lubrication of car

ACCOUNTANTS' ASSOCIATION STANDARD FORM NO. 101.									
INTER-LINE WAY-BILL									
FROM <u>Wellsboro, Pa.</u> TO <u>Holland, Mich.</u> DATE <u>May 16th</u> 189 <u>6</u>									
<div style="display: flex; justify-content: space-between;"> <div> <p>ROUTE:</p> <p>VIA JUNCTION <u>Lyons</u> VIA JUNCTION <u>Sus. Bridge</u> VIA JUNCTION <u>Detroit</u> VIA JUNCTION <u>Grand Rapids</u></p> <p>WITH <u>N.Y.C. & M.C.</u> WITH <u>D.L. & N.</u> WITH <u>C. & O.M.</u></p> </div> <div> <p>WEIGH THIS CAR AT <u>Sus. Bridge</u> MARKED CAPACITY OF CAR <u>For Lumber</u> LBS.</p> <p>STOP THIS CAR AT <u>Sus. Bridge</u> FOR <u>Lumber</u></p> </div> </div>									
<div style="display: flex; justify-content: space-between;"> <div> <p>CONSIGNOR: <u>Full Brook #191</u></p> <p>CONNECTING LINE REFERENCE, ORIGINAL CAR AND WAY-BILL NUMBER, AND POINT OF SHIPMENT</p> </div> <div> <p>MARKS, CONSIGNEE AND DESTINATION</p> <p><u>R. M. Huddleston</u></p> <p><u>Deacon St.</u></p> <p><u>Holland Mich</u></p> </div> <div> <p>ARTICLES AND CLASSIFICATION</p> <p><u>Pollock's</u></p> <p><u>Whitemeak</u></p> <p><u>Beer</u></p> <p><u>68-1/2 Kegs</u></p> <p><u>78-1/4 "</u></p> <p><u>79-1/8 "</u></p> </div> <div> <p>WEIGHT</p> <p><u>12410</u></p> <p><u>7410</u></p> <p><u>4345</u></p> <p><u>24165 30th 7249</u></p> </div> <div> <p>RATE AND AUTHORITY</p> </div> <div> <p>FREIGHT</p> </div> <div> <p>ADVANCES</p> </div> <div> <p>PREPAID</p> </div> </div>									
<div style="display: flex; justify-content: space-between;"> <div> <p>1</p> <p>STAMP OF JUNCTION FORWARDING AGT.</p> </div> <div> <p>2</p> <p>STAMP OF JUNCTION FORWARDING AGT.</p> </div> <div> <p>3</p> <p>STAMP OF JUNCTION FORWARDING AGT.</p> </div> <div> <p>4</p> <p>STAMP OF JUNCTION FORWARDING AGT.</p> </div> <div> <p>5</p> <p>STAMP OF JUNCTION FORWARDING AGT.</p> </div> <div> <p>6</p> <p>STAMP OF JUNCTION FORWARDING AGT.</p> </div> <div> <p>AGENT AT</p> <p>DEST. WILL HEREIN</p> <p>NATION STAMP THE</p> <p>DATE RECEIVED.</p> </div> </div>									

Example of Way Bill on Standard Form of the Association of American Railway Accounting Officers..

tures of the English Railroad Clearing House. It gives light on a number of points not touched upon by Mr. Taussig in the articles published in the *Railroad Gazette*, May 22 and 29, and we hope to reprint it in a future issue.

Mr. Messick described a scheme of his for putting registering gates upon passenger cars, so as to make an automatic record of all passengers entering or leaving a train. He has worked out his plan with considerable ingenuity. His description has no drawings, but he says that a test is to be made of the mechanism at an early day. He has two gates for passengers getting in and two for those getting out. They are duplicated so as to provide against tampering with the register, and there is a connection with an axle of the car so as to make an automatic record of the location of the car when each passenger is registered. A passenger getting on and off at the same station would make two records, which would neutralize each other, leaving the check upon the conductor in its normal condition. Mr. Messick would not have extra gate keepers, like those now employed on the Chicago & Alton, as, with his machine for a check, there would be no objection to the payment of fares in cash. A passenger holding an annual pass would be required to give the conductor a written certificate for each ride.

Machinery Bearings.

The results of a series of experiments on the lubrication of machinery bearings was presented at the spring meeting of The Institution of Civil Engineers of England by John Dewrance, an associate member of that society.

A testing machine constructed especially for the purpose of carrying out the experiments, was so arranged that the loads could be varied for a wide range of pressures, and also the bearings could be easily removed and replaced by others. The pressure was indicated on a

there must be a film of oil at a sufficient pressure per square inch acting on the narrow surface of contact to support the total load put upon the plate. A flat plate was employed in this experiment simply because it was easier to observe the relative position of the hole, the conditions not being greatly changed if the diameter of the shaft be reduced and the plate curved.

The experiments were originally instituted to demonstrate whether with similar lubrication and conditions a bearing surface composed of one alloy would allow of a greater load than a bearing surface of another alloy, and they have proved conclusively that it will not. In other words, the composition of the metal of the bearing surface has little or no influence on the load that the bearing will support.

Many experiments were made with soft metal bearings for the purpose of observing the effect upon them when the shaft sustained a heavy pressure. It was found that a piece of iron will not leave a mark upon a surface softer than itself; it becomes coated with the softer metal. The hard bronze bearings injured the shaft in many of the experiments.

In speaking of the corrosive effects of the oil itself on the surfaces Mr. Dewrance observed that olive oil became black and thick after passing through the bearing several times. This oil after filtration was composed of 16 per cent. of oleate of lead, 9.57 per cent. of oleate acid and 74.62 per cent. of olive oil and glycerine. This oleate acid in the olive oil appears to attack lead, zinc and copper, with great activity. Disks of metals used in the manufacture of bearings were immersed in oleate acid and occasionally drawn up out of the acid so as to be exposed to the air. Lead and zinc rapidly corroded away; copper was corroded, but to a less extent, while tin and antimony were not appreciably affected. In speaking of the compressibility of alloys, Mr. Dewrance suggests that no al-

axes, where there is a constant side movement of the axle in the bearings, which tends to distribute the oil over the bearing surface.

The Composite Brakeshoe.

With the many different materials and combinations of materials that have been used for brakeshoes, few experiments have produced better results for certain service than has Mr. Whitcomb, President of the Composite Brakeshoe Company, of Boston. This shoe as now made has a body of hard cast iron in which are inserted wooden plugs, both the cast iron and wood coming in contact with the wheel. These shoes have been found to be especially adapted to street railroad service, where the energy to be overcome during the stop is not great.

Many are familiar with the fact that wood and metal in contact give a high co-efficient of friction and when wood is used as a brakeshoe the co-efficient of friction is very nearly uniform throughout the stop. The main objection to a wooden brakeshoe is that it burns and wears rapidly in heavy service.

Cast iron gives the highest co-efficient of friction of any of the metals now being used for brakeshoes, but has as an objection the very wide variation in the co-efficient of friction throughout the stop, the co-efficient of friction increasing very rapidly as the speed is decreased. This causes the wheels to skid when heavy braking pressures are used, if the rail chances to be wet or otherwise in poor condition for braking purposes.

Mr. Whitcomb has made his composite brakeshoe of wood and iron in such a proportion and form, that the good qualities of the two materials can be brought out and the objectionable features can be eliminated. Thus the wooden plugs are imbedded in the cast-iron body of the shoe, so that when the shoe is in contact with the wheel very little or no air gets to the wooden plugs,

hence under the conditions prevailing in street railroad service the plugs are not injured by heat, and the combined action of the wood and iron is to make a smooth stop, free from the jar and gripping always accompanying a stop made with the ordinary cast-iron shoe.

This shoe was tested by the Master Car Builders' Association at Wilmerding, Pa., and was found to give a somewhat higher co-efficient of friction than the ordinary metal shoes, while the pull exerted on the dynamometer was very nearly uniform throughout the entire stop. These tests developed the fact that while the shoe answered all requirements for the light-pressure and

The Walschaert valve motion is used for the high-pressure cylinders; on the low-pressure cylinders a valve motion without any eccentrics is used, the same as had already been employed on the inside cylinders of one of the locomotives of the preceding series.

Reversing, as in the latter case, is done by a single mechanism, with a steam counterweight, controlling all four of the valve gears at the same time, and establishing a ratio of cut-off between them for each point of expansion that is independent of the engineer, and is settled in advance. Starting is accomplished as before.

The first engines, C1 and C2, built in 1888, weighed

those of 1892. Like them they owe their great power to the Serve tubes, with which they are fitted. They have, however, returned to the use of a copper firebox, although the weight is still moderate. These fireboxes were put in because the use of steel has not yet become sufficiently well established in France to warrant its adoption in so large an order.

The Serve tubes, 133 in number, have a length of 9 ft. 10 in. and an outside diameter of 2.56 in. The boiler, which is made entirely of steel, with the exception of the firebox, is calculated to carry steam at a pressure of 215 lbs. per square inch.

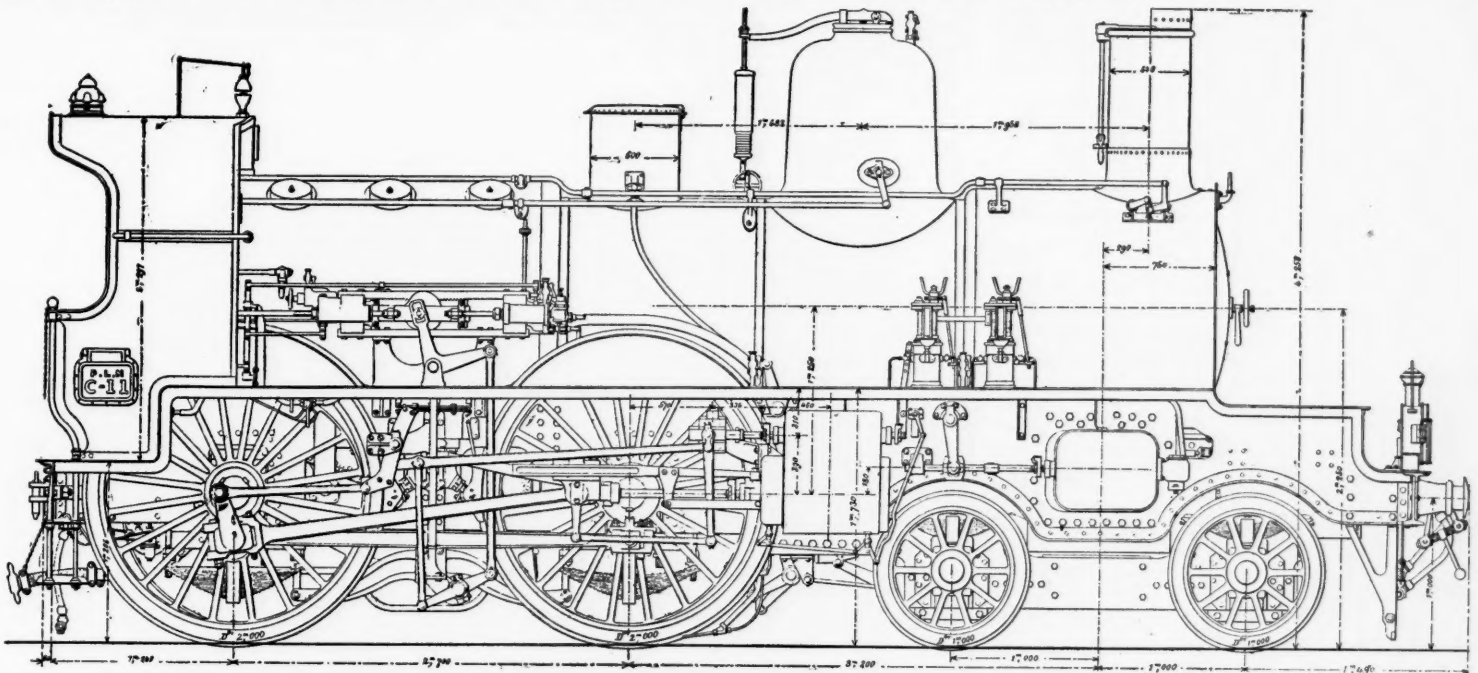


Fig. 12.—Compound Locomotive, 1892—Paris, Lyons & Mediterranean Railroad.

low-speed tests, it was not in its present form as good as many other shoes where heavy pressures and high speeds were employed.

In these tests the body of the shoe became red hot for a distance of $\frac{1}{8}$ to $\frac{1}{4}$ in. from the surface in contact. This had a tendency to char the ends of the plugs and so render the wood inoperative. The shoe then acted like the ordinary cast-iron shoe, and had the additional objection of being in a weaker form, due to the metal being removed from the body of the shoe to allow for the wooden plugs. It was therefore found that under these severe conditions, the shoe was liable to break.

These tests, however, showed that the shoe was well adapted to light service and for this was superior to the ordinary metal shoes. Repeated trials on street cars show that the wearing qualities are quite equal to those of ordinary cast iron of the same grade.

A large number of these shoes are now being used on electric and other street cars and are giving entire satisfaction.

The Present Status of the Compound Locomotive in France.—III.

BY M. MAURICE DEMOULIN, *Engineer Western Railroad of France.*

(Continued from page 392.)

In 1892 the Paris, Lyons & Mediterranean Railroad put into service three compound locomotives (Figs. 12 to 14) belonging to two different types, which were distinguished from the class created in 1888 and shown at the Exposition of 1889, by a higher power coupled with greater lightness. This result was obtained to a certain

about 53.3 gross tons in working order. These new engines, C11 and C12, only weigh 47.9 gross tons, and the locomotive that has no bogie, C51, only 45 gross tons. Nevertheless, these engines are stronger than the preceding, as can be seen by referring to the following table:

	Type.	
	1888.	1892
Graze area	25.19 sq. ft.	21.68 sq. ft.
Section for passage of gases through tubes	3.23 " "	3.66 " "
Total heating surface	1,286 " "	1,591 " "
Diameter of H. P. cylinders	12.21 in.	13.37 in.
" L. P. "	19.63 " "	21.26 " "
Stroke of pistons	24.1 " "	24.1 " "

The increase in evaporative efficiency is greater than that of the heating surface on account of the better utilization of the heat resulting from the use of the Serve tubes—a point that has been demonstrated by very accurate experiments carried out by the company. The diameter of the shell was raised from 4 ft. 1.78 in. to 4 ft. 3.97 in., and the number of tubes from 113 to 133.

The reduction of weight in the new engines was also assisted by the use of thin sheets of steel in the firebox. These were only .39 in. thick instead of .59 in.

Experience has practically confirmed the hopes that were entertained in the use of the compound principle combined with the high steam pressure of 215 lbs. per square inch. Hence the Paris, Lyons & Mediterranean Railroad put 40 compound locomotives into service during the year 1894. These locomotives were intended for fast express service, and it is due to them that they have been able to increase the speed of these trains without decreasing the number of cars hauled and reducing the time from Paris to Marseilles to 13 hours.

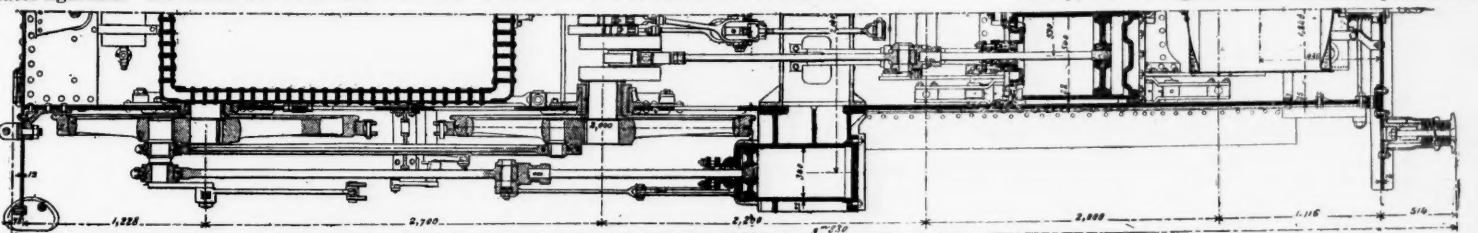


Fig. 15.—Plan of Four-Cylinder Compound Express Locomotive, 1894—Paris, Lyons & Mediterranean Railroad.

extent by the use of the Serve tubes. These engines, like those preceding them, have boilers intended to carry steam at a pressure of 215 lbs. per square inch, but the use of steel has been extended still further and used for the firebox, which, in 1888, was made of copper.

Four cylinders are still used, but the high-pressure cylinders, instead of being between the frames as in 1888, are on the outside, while the low-pressure cylinders are the ones placed on the inside. The pistons of these two pairs of cylinders drive two axles, which are nevertheless connected by side rods. These two axles, instead of being between the two pairs of truck wheels, are placed at the back, the front being carried in one case by a single axle running in radial boxes, and in the other by a bogie truck having a certain amount of side play.

This new type, Fig. 15, designed by M. Ch. Baudry, the Chief Engineer of the company and successor to M. Henry, is a modification of the engines of 1892, already described and which should still be considered as experimental machines. It differs, furthermore, in several important points.

Like their predecessors, these new engines are of the four-cylinder compound type; the two high-pressure cylinders are upon the outside and drive the fourth axle; the low-pressure cylinders are upon the inside and drive the third axle. In spite of this distribution of the power side-rod/s are used and the low-pressure cranks are keyed upon their axle 135 deg. in advance of those of the high pressure.

The boilers are practically of the same dimensions as

in one characteristic detail which gives them a somewhat ungraceful appearance to which the public has not been accustomed, and which has given them the nickname of the "beak" engine. In short, they carry at the front end, a sort of prow or plow intended to lessen the resistance of the air through which they are moving. In the same way, the engineer's shield, instead of presenting a flat surface at right angles to the direction of motion, is arranged in the form of an angle to cut the air: the stack, the dome and the sandbox are enclosed in the same casing that ends, front and back, in a sharp edge. It is still impossible to calculate the benefits that can be derived from this special arrangement, which has also been applied experimentally on the Eastern Railroad.

In other respects these engines are similar to those that have been built during the past few years for the Paris, Lyons & Mediterranean Railroad.

The stack, which is of large diameter, is contracted by a central hollow core placed above the exhaust and of a variable section, so fashioned as to give the proper expansion to the jet of steam. This device was applied by the company in consequence of experiments which gave good results from the standpoint of the utilization of the jet of exhaust steam.

The pistons are of cast iron; their rods are of steel and screwed into the heads. The connecting-rods and axles are also of steel.

The two driving-axes are provided with oil boxes having three brasses on the Raymond & Henard system. The cylinders are oiled by means of a screw-compressor lubricator, worked by hand from the cab.

Although the Paris, Lyons & Mediterranean Company have actually completed their experiments upon the operation of these engines the results have not yet been made public.

Before these express engines of which we have just been speaking were put into service, the Lyons Com-

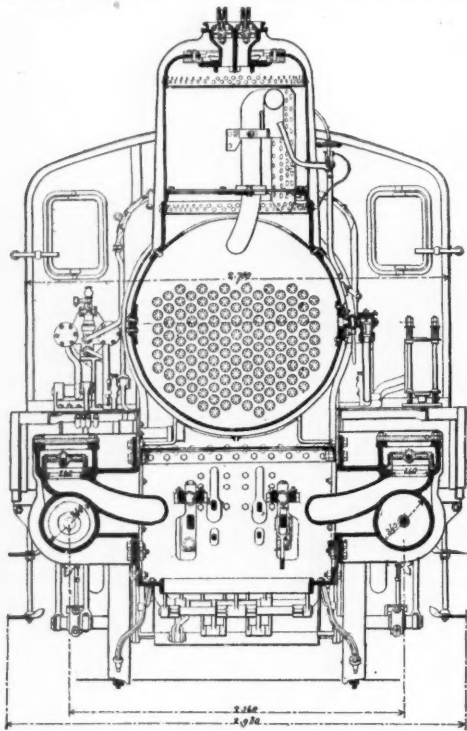


Fig. 13.—Cross-Section View Through the Middle of High-Pressure Cylinder—Compound Locomotive, 1892.

pany, in 1893, built ninety compound locomotives (Nos. 3,211 to 3,300) of a new type with the eight wheels of 4 ft. 11 in. diameter, intended for hauling through freight trains on the main line between Paris and Marseilles, where the grades are easy and the traffic heavy, and for hauling passenger and mixed trains on lines where the profile is quite undulating. The regular speed of these engines ranges from 21 to 28 miles per hour with a maximum of 40 miles.

(TO BE CONTINUED.)

Color Testing.*

During my service as Medical Director of the relief department of the Burlington System, it was my duty, not only to look after all matters concerning the eyes of the employees, but also to have general supervision of the sick and injured men, amounting to an average of over 400 cases on hand daily; to establish the physical standards to be required of men entering the service; and to fix the methods by which the examinations should be carried out by the medical examiners. In this connection much attention was paid to the question of the best tests for defective color-sense.

Previous to Oct. 1, 1893, Thomson's stick was used to test the color-vision. This test, devised for use on the Pennsylvania lines, consisted of 40 colored worsteds suspended from a stick, each skein being numbered for purposes of record, the numbers being covered while in use. This arrangement was found to be too fixed, for although the position of the colors on the stick could be changed it was seldom done, and too great an opportunity was offered for men to learn beforehand the position of the colors well enough to pass the test; the stick was awkward to carry about and the worsteds were not sufficiently protected from light and smoke, so that they were soon faded and soiled.

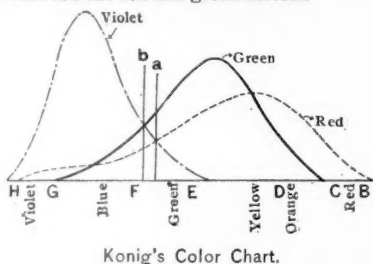
In September, 1893, all the medical examiners of the Burlington were supplied with a set of Holmgren's worsteds having 114 colors beside the three test-colors, and after that date all color tests were made with this standard set. Each examiner was personally instructed by me in the use of this test; and a circular was also sent to each one, giving in the first part the rules as laid down by Professor Holmgren for conducting the examinations, and in the last four pages a brief summary of recent views on color-vision. In this standard color-set each skein was numbered with a small brass tag, so that the colors selected by any candidate as looking to him like a test-skein could be made a matter of record, and these records were all sent to me in Chicago for final inspection and approval.

* A paper read before the Boston Society for Medical Improvement, November, 1895, by Dr. Charles H. Williams, of Boston.

In case any one was found deficient in his color-perception by this test, a second examination was made, using a red and afterwards a green flag as the test object and having the candidate select from the colors all that looked to him like each flag. This was done not to increase the scientific efficiency of the test, but rather to show to the employing officers and fellow-employees what colors looked to the candidate like the flags; and when, for instance, a man would pick out among other colors a green as looking to him like a red flag, the confidence of all parties in the justice of the rejection of such candidate was increased. Any doubtful case was referred to me for further examination by various tests to see if they confirmed the first results, and in no case have I found a candidate who was rejected by the Holmgren test who was not defective in his color vision. From October, 1891, to May, 1895, 159 men were rejected in the train, engine and yard service on account of this defect. This includes some employees already in the service, but principally applicants for employment. The number of rejections did not, however, reach the usual four per cent. found among men at large, for many of those who were defective did not apply to us for work, knowing that they would have to pass a medical examination.

Before referring to any of the other tests for color-sense, let me briefly show the reasons which led to the selection of the colors used in the Holmgren test. Color is a sensation, like sound, and just as our ears are able to recognize certain vibrations of the air as musical sounds, so our eyes can recognize certain higher vibrations as colors. Careful study has shown that there are probably three primary colors, that is, colors that cannot be produced by the mixture of two or more other colors; these are red, green and violet, and all the varied hues of the spectrum can be produced by a proper mixture of these three. To represent the intensity of the perception of these colors in different parts of the spectrum König made the following chart, which gives some valuable information in regard to color-perception.

In the lower part of the above diagram, the position of the colors of the spectrum and the principal Fraunhofer lines are indicated, and in the upper part the three curves show the relative sensation for red, green and violet in different parts of the spectrum. At the red end of the spectrum up to the line C, we get only the sensation of red, unmixed with any other color, and in the case of a red-blind person we would expect to find a shortening of the red end of the visible spectrum, which is what we get on testing such a person. Again at the point where the curve for red crosses that for violet we have a green color in the spectrum. At this point we have an equal mixture of red, violet and green sensations up to the point where these curves cross, and above that point only a green sensation. Now as the equal mixture of red, violet and green produces white, we have at this point a green sensation diluted with a certain amount of white. Now suppose a person who is green-blind, that is, one on whose visual apparatus green makes no impression, was to look at this point in the spectrum, he would see only a white band, or a gray which is impure white, but no other color, and this band of white or gray, which is what we find in cases of total green-blindness, has been called their neutral point. If we select for a test-color a green which corresponds to the green seen by a normal eye at this neutral point and ask a green-blind person to pick out from a mass of colors all that look to him like this green color, he will select greens, grays and light browns, because these all look alike to him. The test with the green skein shows the existence of defective color-perception if any exists, but does not show whether the defect is more for green or for red. In order to determine where the principal defect lies, we use a second test-color made up of red and blue, that is a light purple or rose color. The red blind see the blue in such a color more clearly than the red, and they will select to match it other purples, blues and violets; but the green-blind will see in this color a mixture of red and blue which would be to him a gray, and he will match this color with purples, grays and even greens, which also seem gray to him. In this way the diagnosis is established between the red and green defects.



NOTE.—a indicates the neutral point for green-blind, b for red-blind.

If all cases of defective color-vision were due to the total want of perception for red or for green, nothing would be easier than their detection and classification; but in practice these cases are a minority, and what we generally have to deal with are cases of partial defect in the recognition of one or both of these colors, and this partial defect may extend from extreme cases up to those that are so slight as to be hardly recognizable, and therefore harmless.

The recognition of color depends on, first, its hue, or the number of vibrations; second, its purity; third, its intensity; and fourth, the visual angle under which it is seen, that is, its distance and extent of surface. And while the Holmgren test enables us to determine quickly the fact of defective color perception, it does not give us a quantitative measure of the defect.

The regulations of the Dutch State railroads require all persons employed in certain departments to have their color-sense estimated: "A. qualitatively, by pseudo-isochromatic tables of Stilling, and with the

wools according to Holmgren's method; and, B. quantitatively by Donder's method, which must be applied in every instance."

Donder's instrument consists of a disk of wood some 8 in. in diameter in which are inserted half a dozen small disks of colored glass—red, green, blue, etc. This disk is revolved in front of a standard candle; and on the other side of the disk is a movable diaphragm with holes of various sizes so that the different colored lights can be looked at through any of these openings.

In some correspondence that I had with Professor Snellen, of Utrecht, on this subject, he writes, under date of Feb. 11, 1895: "Distance and diameter are the two factors in determining the amount of color-sense, just as with the figures for testing the vision. In fact, we could do with one disk of each color as well as with one letter, but then the patient knows too easily what and how far he has to see, and we want a variety of objects, sizes and distances to prevent the patient from guessing what he does not see clearly. For vision we have

the formula $V = \frac{d}{D}$, in which d is the distance at which

the patient can still see the letters, D the distance at which they ought to be seen (for letters the distance at which they embrace an angle of five minutes). Far more than vision, color sense is

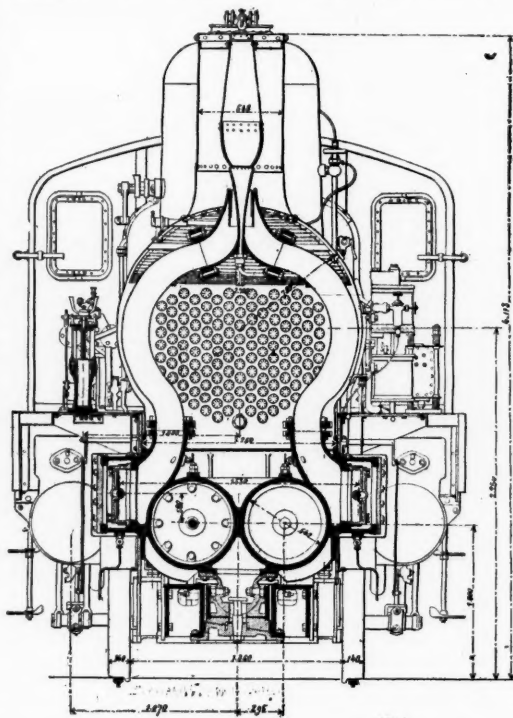


Fig. 14.—Cross-Section View Through the Middle of Low-Pressure Cylinders—Compound Locomotive, 1892.

dependent on color and strength of light. The same eye requires a different angle under different circumstances. Therefore Donders accepted the formula for color-sense as $\frac{a}{A}$, a being the angle at which

the examined eye distinguishes, A the angle at which the examiner sees the same. The angle is for each disk proportional to the distance. So if we see red and green at six meters and a patient only at one meter, his color-sense would be according to Donders $= \frac{1}{6}$.

The rules for the Dutch State railroads require for engineers and firemen a power of distinguishing colors of at least four-fifths, and for other scheduled employments of at least three-fifths.

I made an apparatus about two years ago on the same general principles as the Donders instrument, but which admits of more varied use: a large disk 18 in. in diameter is fitted with 13 disks of colored glass; the position of the glasses in the disk can be varied from time to time, or new colored glasses can be inserted; this disk can be revolved so as to bring any color in front of a fixed light; a movable diaphragm is arranged in front of the glasses so that the colors can be seen as disks of varying size, and the opening in this diaphragm correspond in size to the component parts of the letters in Snellen's test-types; that is, at 20 ft. with the smallest opening the color will be seen under an angle of one minute, and would correspond to the apparent size of a signal the size of a switch-light lens when seen at a distance of 1,500 ft. If the candidate cannot distinguish the colors when seen under this angle the size of the opening is increased. This instrument has one vacant space, so that when this is brought in front of the light the regular switch lenses and semaphore glasses can be placed in front of the opening, either alone or in combination with smoked glasses, and in this way the effect of increasing or diminishing the intensity of the light and color can be studied. It often happens with a candidate defective in his red perception that when a smoked glass is added to a standard red lens he will call the color green, on account of its diminished intensity, and a similar condition is very likely to happen in actual service when a switch lamp has smoked the back of the red lens in the lantern, so that an employee who was defective in his color-sense for red might easily mistake this smoked red danger signal for the green light of safety.

The recognition of colors when seen through the smaller openings of this instrument is also useful in detecting cases of central scotoma, such as occur in tobacco amblyopia, where there is a defective perception for colors over a limited area in the central macula region, while outside of this, the perception may remain normal. In such cases if a large object such as the Holmgren worsted is used, a portion of the retinal image of such an object may fall outside of the diseased area so that its color can be easily seen, whereas if it was limited to a small area such as would be covered by the image of a distant signal it could not be recognized.

Captain Abney has brought out this point in his test with clay pellets three-sixteenths of an inch in diameter, which he describes in his book on color-vision as "painted with water-colors mixed with soluble-glass solution of the same colors as the wools. These are

placed in a shallow tray and presented to patients affected with this central color-blindness to pick out all the pellets which match reds and greens. They will tell you that they see neither one nor the other, though they will pick out the blue pellets unerringly. A red pellet they will match with a green, gray or a brown one, and a green one with the same. If, however, you instruct them to turn their eyes a few degrees away from the tray they will tell you they see all the colors, and, as they endeavor to pick them out, they, with a natural instinct, direct their eyes again to the collection, when once more the colors vanish. It is most pitiable sometimes to see the distress which this simple test occasions. The sight of the colors for an instant

or position of colored signals or lights should be themselves tested for color and form-vision."

The committee of the British Medical Association also recommended the Holmgren test as the one best suited for railway service.*

Not only is it necessary test the color-perception of the men who are to use colored signals, but some test should also be applied to the signals themselves to insure their uniformity and value. In looking over the stock of red switch lenses at one of our large storehouses, I found there was a very considerable variation in the shade of red among them, and the only test in use was for one of the men to look over each new lot that came and discard such as seemed to him too light or too dark. The danger

Such an instrument is now in use on the Burlington, and by this means the red lenses can be quickly and easily inspected.

Underground Electric Road in Budapest.

To its 28 miles of underground conduit electric railroads in successful operation, Budapest, Austria-Hungary, has added another rapid-transit tunnel in the main street. The Millennium-Hungarian national fair is in a park about two miles from the center of the city. Several surface car lines run through side streets along the side of the park. A franchise for a surface railroad in the main thoroughfare, Andrássy avenue, which is from 115 ft. to 148 ft. wide, and is used as a speedway, had several times been denied by the authorities; yet the requirements of the fair made a direct connection between the business center and the center of fair, by way of Andrássy avenue, desirable. The tunnel idea was advanced. Careful estimates by government engineers placed the cost at \$656,000 per mile of double-track road complete, ready for operation. Assuming cars on five minutes' time intervals from 6 a. m. to 11 p. m.—17 hours—204 cars starting each way, the cars having a capacity of 50 passengers, 20,400 passengers can be carried per day. The schedule time from end to end is 18 min., corresponding to a speed of 125 miles per hour. It was figured that under economical management the proposition would be a paying investment. The franchise was taken by a private corporation for 90 years with 50 years' exemption for taxation.

Ground was broken on August 13, 1894, the tunnel completed in December, 1895, and the railroad opened for traffic on May 2, 1896, the opening day of the fair. The work was done within the estimate. Nearly 25,000 passengers daily were carried during the first three days of operation.

The exact length of the tunnel is 10,467 ft. It connects with 1,640 ft. of surface lines in the park proper, making the total length, therefore, 12,107 ft. and there are 11 stations. Nearly all of the earth was removed from the surface without tunneling, 262,000 cu. yds. being carried on 500 carts to distances of from 7,500 to 10,000 ft. through crowded streets to the great discomfort of the com-

and their immediate disappearance in the cases that I have tried seem indicative of something terrible, for they have no idea of the cause of this phenomenon."

I will not weary you with reports of cases, but will mention only one that shows the necessity for care in making these color-tests. An engineer had been pronounced defective in color-perception by the surgeon of his road. He then went to two oculists who both gave him a certificate that he was all right, and with these he applied for re-instatement. He was referred to me for final testing. With the Holmgren wools he picked out one confusion color with the greens to match the green skein, but he was very hesitating and frequently would pick up a green color, compare it with a test-skein and then throw it aside, and he left most of the green colors unselected in the general heap of worsteds; with the red worsteds he made no mistake. With the green flag he picked out three confusion colors as looking like the flag, and with the colored glasses, in the revolving disk, he called three red glasses green, and a light-red glass white; the red glass such as is used in semaphore arms he called green, and also one of the darker switch-lantern lenses, thus confirming the first test most completely.

In the year 1892 two excellent reports were made in England on the subject of color-vision, one by a committee of the Royal Society, the second by a committee of the British Medical Association. The first committee, after spending two years in examining various methods and forms of apparatus and in practically testing a considerable number of persons who were defective in their color-vision, agreed unanimously on the following recommendations:

"(1) That the Board of Trade, or some other central authority should schedule certain employments in the mercantile marine and on railways, the filling of which by persons whose vision is defective either for color or form, or who are ignorant of the names of colors, would involve danger to life and property.

"(2) That the proper testing, both for color and form, of all candidates for such employments should be compulsory.

"(3) That the testing should be entrusted to examiners certificated by the central authority.

"(4) That the test for color-vision should be that of Holmgren, the sets of wools being approved by the central authority before use, especially as to the correctness of the three test colors, and also of the confusion colors. If the test be satisfactorily passed it should be followed by the candidate being required to name without hesitation the colors which are employed as signals or lights, and also white light.

"(5) That the tests for form should be those of Snellen and that they should be carried out as laid down in Appendix VI. It would probably, in most cases, suffice if half-normal vision in each eye were required.

"(6) That a candidate rejected for any of the specified employments should have a right of appeal to an expert approved by the central authority, whose decision should be final.

"(7) That a candidate who is rejected for naming colors wrongly, but who has been proved to possess normal color-vision, should be allowed to be re-examined after a proper interval of time.

"(8) That a certificate of the candidate's color-vision and form-vision according to the appointed tests, and his capacity for naming the signal colors should be given by the examiner; and that a schedule of the persons examined showing the results, together with the nature of the employments for which examinations were held, should be sent annually to the central authority.

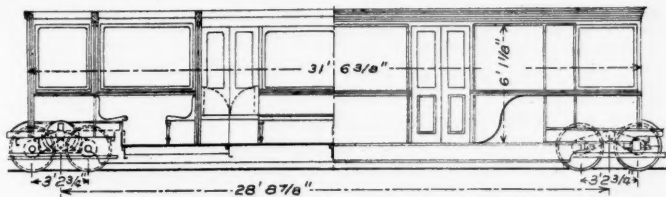


Fig. 3.—Type of Cars on the Underground Road.

"(9) That every third year, or oftener, persons filling the scheduled employments should be examined for form-vision.

"(10) That the tests in use and the mode of conducting examinations at the different testing stations should be inspected periodically by a scientific expert, appointed for that purpose by the central authority.

"(11) That the colors used for lights on board ships and for lamp signals on railways should, so far as possible, be uniform, and that glasses of the same color as the green and red sealed pattern glasses of the Royal Navy should be generally adopted.

"(12) That in case of judicial inquiries as to collisions or accidents, witnesses giving evidence as to the nature

of the disk we soon reach a point where the periphery of the disk is lighter than the translucent center; in other words, a point where the light reflected from the opaque periphery of the white disk, which comes from the right-hand burner, is greater in intensity than the light from the left-hand burner, which is transmitted through the translucent center, and by moving the disk toward the left a point will soon be found where the center of the disk and the periphery appear alike; that is, where the light from each side is equal, and if the apparatus is properly adjusted, this point will be in the middle of the bar. With the instrument in a dark room, if we place a standard red lens at less than its focal distance, say $1\frac{1}{2}$ in., in front of the left-hand burner and the lens to be tested at the same distance in front of the other, so that their axes are in line with the center of the openings in the shields, we shall find the disk will have to be moved toward either one or the other ends of the bar to get a point where the light from the two lenses is equal, as

the lens to be examined will probably not transmit exactly the same amount of light as the standard lens. If the disk has to be moved toward the standard lens it shows that the new lens is lighter than the standard, and vice versa, and an arbitrary limit of 18 in. to 22 in. on this bar, measured either way from its center, can be taken as a range of variation that can be allowed with safety. The standard lens is selected as transmitting a dominant wave-length of about 1055000 mm., and having a medium intensity of color.

* For a synopsis of this report see *Railroad Gazette*, July 8, 1892, page 516.

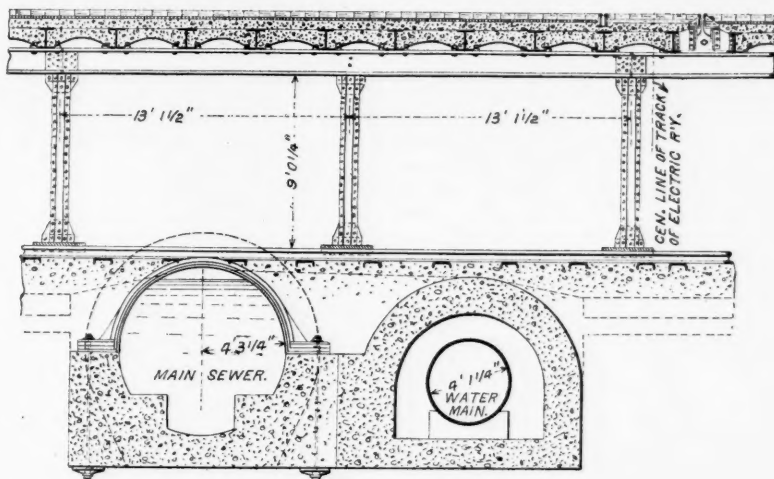


Fig. 2.—Longitudinal Section of the Tunnel.

munity. Fig. 1 shows a cross section of the tunnel and Fig. 2 a longitudinal section. The steepest grade is 2 per cent.; it occurs at the spot shown in Fig. 2, where the tunnel crosses over the main sewer and under the tracks of the surface electric conduit railroad. The shortest radius of curves is 131.25 ft. The bottom and the side walls of the tunnel are built of concrete, the latter were constructed first. The ceiling consists of concrete arches between I beams. These beams rest in the center of the tunnel on a stringer, which in turn is supported by columns, 13 ft. $1\frac{1}{2}$ in. center to center. The I beams were placed first, after that the stringer and the columns. The tunnel measures 9 ft. $0\frac{1}{4}$ in. from the top of the rails to the bottom of the beams, and is 19 ft. $8\frac{1}{4}$ in. wide.

Fig. 3 represents the car. The body is suspended between the trucks, and the bottom of the car is brought within $15\frac{1}{4}$ in. of the top of rails. The clearance between the car and tunnel wall is $7\frac{1}{2}$ in. The outside dimensions of the car body are: 31 ft. $6\frac{3}{8}$ in. long by 7 ft. $6\frac{3}{4}$ in. wide by 7 ft. $1\frac{1}{2}$ in. high. There are two doors on either side of the car, $14\frac{1}{2}$ in. wide in the clear; those on the side of the columns remain closed, and seats, folding back sideways, are provided to utilize the space. The doors cannot be opened until the current is turned off, nor can the current be turned on until the doors are closed. The cars seat 30 persons. The partitions shown in the drawing have been taken out, but the space over the trucks is partitioned off from the rest of car body for the motorman.

The current is fed in and returned through overhead wires; the rails are not in the circuit. Two 300-volt 100 H-P. generators for the tunnel were added to the existing power station.

The station platforms are from 10 to 16 ft. wide and from 66 to 98 ft. long. The station walls are covered with white glazed tiles. All iron parts throughout the tunnel are painted a silver color, which reflects the electric light and makes the tunnel as light as day.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

We lately had occasion to sum up the platform of the Adullamites assembled in Convention at Chicago. The populists who assembled later in St. Louis nominated the same Presidential candidate as the alleged Democratic convention had already nominated, and adopted at the same time a platform, somewhat more silly than that which had been adopted at Chicago, but expressing essentially the same general principles. The action of the St. Louis convention makes the duty even more imperative on every good citizen to do all that he can to bring about the triumph in this campaign of the forces and the principles which underlie all possible free government.

The populists seem to have a grudge against almost every established institution and against every recognized means of government, and naturally, they are especially anxious to get the railroads of the United States under the direction of such sagacious persons as Cyclone Davis and Ignatius Donnelly. In their platform they say "the government should own and operate the railroads to the end that the tyranny and political power now exercised by the great railroad corporations, which result in the impairment if not the destruction of the political rights and personal liberties of the citizen, may be destroyed." They demand also that the telegraphs should be owned and operated by the government in the interests of the people. It is impossible to imagine a more entertaining and more instructive experiment in government than would be a state governed by such men as made up the St. Louis and the Chicago conventions, but we pray that they may never have an opportunity to experiment with this government. It might be worth while, however, to set off one state as a temporary empire of populism. In about two years people would see such a display of "tyranny and political power" as has never yet been witnessed in the world.

The Southern rate war has been suddenly suspended by an injunction from the United States Circuit Court. The 33 1/2 per cent. reduction made by the Seaboard Air Line was met by the Southern States Freight Association by a vote (it had not been carried into effect) to reduce all competitive rates eighty (80) per cent. This savage blow at once confirmed the expectation, quite generally entertained, that the war was to be a desperate one, and it is not to be wondered at that an injunction was thought of. It was asked for by the Receiver of a road in the hands of a United States Court, the Port Royal & Augusta, and was granted by Judge Simonton, sitting in chambers at Flat Rock, N. C., on Monday last. He issued a temporary injunction against the Seaboard Air Line, the Southern States Freight Association and lines connecting and acting with it from making any reduction whatever in existing freight or passenger rates. The defendants are ordered to appear at Greenville, S. C., on August 15 to show cause why the injunction should not be made permanent. The temporary order provides that

until that hearing, and until the filing of any order which the court may see fit to make upon or after such hearing, the Seaboard Air Line is restrained and enjoined from continuing in force and further operating the reduction in rates put in effect on July 17 last for freight and passenger traffic, or from making any further reduction or cut whatever in either freight or passenger traffic, or from making any change, or from operating, either alone or in combination with other transportation lines, any rates different from those in effect July 12, 1896. It is further ordered that the Southern Railway Company and all other members of the Southern States Freight Association be enjoined and forbidden to cut rates in any manner or from carrying into effect the reduction of 80 per centum from the rates in effect July 12, 1896. H. S. Haines, Commissioner of the Southern States Freight and Passenger Association, is also enjoined. The application for the injunction was in the shape of a bill in equity, brought for J. H. Averill, Receiver of the Port Royal & Augusta. An injunction against rate reductions is a novelty, but the result can hardly be otherwise than good. Two weeks will afford ample time for reflection, and the delay should lead to negotiations for a peaceful settlement. The aggressiveness of the President and Vice-President of the Seaboard Air Line indicates that they believe their grievance to be a very serious one, but the essential factor in the contest is a matter of steamboat competition, in which the conditions are always favorable to desperate fighting (more than in railroad warfare), and in which the waste of money is generally less disastrous; which makes it particularly deplorable that a fight that ought normally to be confined to such a limited territory should be extended to thousands of miles of railroad. Mr. St. John intimates that his courage will hold out until he shall have emptied the Southern's treasury; but the Southern has allies which are numerous and by no means without power (though there are no giants anywhere in that territory) and the Association seems to have considerable grit. In view of the utter impossibility of "cornering" the privilege of sailing vessels between Baltimore and Norfolk the Southern would seem to have the best prospect of victory so far as the original ground of strife is concerned, and, the contest having been carried into the railroad rates, it looks as though the unyielding attitude of the Southern and its fellow members of the Southern States Association was simply a continuance of their former strenuous efforts to induce the Seaboard Air Line to join the Association. And, so far as an outsider can see, those efforts are in the right direction and ought to succeed.

The Logan Collision.

The butting collision at Logan, Ia., on July 11, killing 26 persons (not 31, as reported in the newspapers at the time) was the worst railroad disaster in the United States since the collisions at Jackson and Nichols, Mich., in October, 1893, and the circumstances attending it bring up those delicate and serious questions, concerning the safe management of trains, which formerly were thrust upon the attention of railroad officers quite frequently, but which for the past two and a half years have not been much discussed, because, happily, the object lessons calling them to mind have not occurred. Whether this absence of warning has been a blessing or otherwise, it is difficult to say. Certain it is that the possibilities of disasters are still with us, and warnings, equally definite except in the absence of deaths and great financial loss, have been before every railroad officer constantly. If any superintendent has been so fortunate as to have had no negligence on his own road he has had opportunity enough to learn of it on other roads in the accident records published every month; and unless the whole of one's employees rank 100 it is always wise to examine the lessons of other people's blunders.

The actual diminution in the number and severity of collisions is due partly to the great falling off in the number of trains, partly to the consequent dismissal of some of the less efficient conductors, enginemen and telegraph operators and partly to the introduction of the block system and improvement of discipline. The effect of these various circumstances on any one road can be estimated only after a thorough study of the conditions of that particular road.

The Logan collision is reported to us as follows:

The passenger train (westbound) was an excursion of the Union Pacific Pioneer Association, an association of employees who have been in the service of the Union Pacific Railroad for ten years or more. Heretofore they have always gone to some point on the Union Pacific road to picnic each year, but concluded to go over into Iowa this time. The train consisted of 15 coaches and a baggage car and was hauled by an air-brake freight engine, which was in charge of an old and reliable engineer running constantly on that portion of

the road. The conductor was next in line for promotion to a regular passenger run and was running a freight train constantly between Boone and Council Bluffs; so that both of these men were not only familiar with the road, but one would naturally suppose thoroughly familiar with the movement of all trains on that division. Men who know the conductor state that he was an especially good man. They commenced loading the excursion train for the return trip about 6 p. m. and the conductor was sufficiently careful to think of sending a flagman to flag No. 2, which was due at Logan at 6:24 p. m., but was not scheduled to stop there. He was afraid that it might strike some of the people who were crossing the main track to reach the excursion train. No. 2 passed about on time. He called for his orders about the time this train passed and received an order which was made O. K. at 6:34 p. m., substantially to run special (west) to Council Bluffs, and that he could have until 7:10 to reach Loveland (13 miles) against No. 14, an eastbound Sioux City & Pacific train which runs from Council Bluffs to Missouri Valley Junction over the C. & N. W. track, and is due at Loveland at 7:07 p. m. When he read this order he remarked to the operator, "There is nothing against No. 38," a regular freight train which was due at Logan at 6:43 p. m. The operator replied "No, they are about on time." In spite of all this the conductor delivered the order to the engineer and they immediately started to pull out of the side track. They had just cleared the side track with their train when they were struck by No. 38, which was exactly on time.

The trains were going probably 10 miles an hour when they struck. The weight of the passenger train was sufficient to send the front end of the baggage car into the tender and lift the rear end sufficiently so that it shot over the platform of the first coach and telescoped nearly its full length just above the tops of the seat backs; and most of the deaths were caused by the end of the car striking the passengers in the upper breast or head, and in a good many instances they were decapitated. The equipment was all sound and good, and there does not appear to have been any breaking of sills in the damaged cars.

You will note that the conditions were apparently not favorable to an accident. Here was a train standing on the side track manned by two old employees who were regularly employed in freight service and thoroughly familiar with the regular and extra train movement, much more so than regular passenger train men, and from an operating man's point of view, much safer men, for obvious reasons. The remark of the conductor shows that he had his mind specifically upon the one train which was then out. There was no confusion in loading the train, no disorder among the passengers and no drinking. The telegraphic order was plain and explicit and of a kind which the conductor and engineer were accustomed to receive.

Of course the lesson is what has probably occurred to every train dispatcher and superintendent, and that is, never to give an important train a running order against what may be termed a second train until the first has arrived; yet it is the constant practice to give such orders, for it would result in a very serious delay to trains, where there is heavy traffic, if, for instance, a dispatcher could not give the right to run against the fifth section until the other four had passed the station where the train was waiting.

What explanation the conductor and engineman have to offer we do not know. Warrants were issued for their arrest, and we suppose they are to be tried on a charge of manslaughter. Forgetfulness is a weakness to which every human being is liable, and, if the aim is to prevent similar collisions in the future, the question hinges not so much on the forgetting in this particular instance as upon the routine which these men had established for themselves, or the company had established for them, to provide against disastrous consequences from forgetting. The trial ought to bring out the evidence upon this point.

Assuming that these men had as vigilant mental habits as we can expect to get for this kind of service, the question at once arises, Why was not the block system used on this road? And the fact that other roads in that region do use it will add force to the question. Various changes in train dispatching rules might be suggested, such as that mentioned by our correspondent, above; or that an excursion train should not be moved on single track at all without orders specifying the stations at which it should meet all opposing trains, both regular and extra; or that (except in emergencies) extra passenger trains should be run only on printed time-tables, making them superior to freight trains; but these remedies are either impracticable or afford safeguards against only a part of the dangers feared, and the consensus of opinion seems to reject them; therefore, we say, the inquiry may as well be directed at the outset to the more radical remedy for collisions, the space interval.

The first reason for not using the block system on a single track line of thin traffic is that without costly signals, additional sidetracks and many additional telegraph operators it is unsafe. It certainly is imperfect; but the Canadian Pacific, the Wabash, the Erie, the Chicago, Milwaukee & St. Paul and other roads employ it without all of the refinements found on roads doing a heavy traffic, and they find satisfaction in it and have adhered to the plan continuously for six, eight and ten years. This extended experience cannot be ignored. For that matter, there are some little imperfections in the management of the block system on nearly every road that operates it, big or little. Very few pieces of road can boast of the elaborate mechanism used in the tunnel in New York City, or on the underground road in London.

The space interval, even imperfectly managed, introduces a radical change of principle. As regards trains running toward each other, there is a station operator habitually looking out for the safety of all

trains at one meeting point (the station next to him) instead of a conductor, with numerous other responsibilities, acting under circumstances which are constantly changing, and often having to contemplate several meeting places at once.

It has been suggested that, using the block system without electric locking, a station operator might have forgotten train 38, the same as the conductor did. That is true; but we have the accumulated experience of several years, above mentioned, showing that no bad disasters have resulted from dependence upon single-track blocking, (and so far as we now recollect, there has not been reported any lapse whatever, bad or otherwise, on roads using the system, that has led to a butting collision or to conditions making one possible); on the contrary, there are superintendents (of single-track roads where the block system is used but where conductors and enginemen act under the time-table rules the same as though it were not in force) who can tell of specific cases where blocking has prevented butting collisions; that is, where trainmen made blunders which would certainly have resulted in collisions but for the check afforded by the block system. And we have the lessons of many years that under the time-interval system conductors do make these blunders and that lazy-minded enginemen leave the conductors to do their thinking for them.

This failure of enginemen and conductors to check one another is one of the worst difficulties in administering the time interval rules. The possible consequences of a mistake are so terrible that no one would think of trusting a train to one person, however competent he might be, and yet the rule providing against this possibility (No. 120, which makes the conductor and engineman both responsible and under which they ought regularly to confer with each other) is generally left to enforce itself. This failure to confer with each other at critical junctures is a defect in every-day practice which seems to be just as prevalent now as it was 10 or 20 years ago.

In considering the introduction of the block system, as in a hundred other important matters, the railroad manager finds the financial question constantly thrusting itself to the front; and many managers have, doubtless, found much satisfaction in being able to figure out something like a definite sum which appears to have been saved in the accident account, after working under the new plan a year or two. Sometimes, indeed, the ability to show such a saving has been the sole but sufficient support for the argument against a proposition of the president or some director to abandon the alleged unnecessary expenditure. But this is a crude test of the value of an important safety measure, and unsatisfactory at best; for no road has averages of the cost of accidents that can be used for intelligent comparisons. If the additional expense for operators is no greater than your former ordinary expenditure for collision damages, collisions must have been pretty frequent and there certainly can be no need of urging you to adopt the space interval; but ordinary expenditures by no means constitute the whole of the factor to be considered. One collision like that at Logan vitiates all averages and damages your reputation more than the common mishaps of 20 years. And, finally, is it not rational to spend money to secure the peace of mind of the Manager, Superintendent and Dispatcher, while conducting their every-day business?

The New Railroad Lines of 1896.

The tabulation which we published last week gave the companies building new railroad and the new lines, and furnishes a basis for study of the present tendency in railroad construction. Thus if we divide the new railroad of the first six months of this year roughly into three classes—first, roads built to form new routes, and by their nature more or less competitive; second, roads built into growing sections previously poorly supplied with railroads, and third, short branch roads or local feeders, whose inception is generally due to the establishment of some new freight-producing enterprise or the growth of a near-by section of country; we find that of the 796 miles reported built so far this year 265 miles would be classified under the first heading, 365 miles under the second and 170 miles under the third. This classification is not given as strictly accurate, but it is of interest as an approximate division based on the service to be given by these new railroads. The mileage under the first heading is larger than might be expected, but it is not great enough to do serious damage to the revenues of existing lines. It bears a rather large proportion to the total we are dealing with, but a few years ago a number of companies each built annually as much as all the roads included in this

group in our present list. As late as 1890 seven companies in the United States built 1,120 miles of the 6,000 miles reported built in that year. Each of these companies built over 100 miles of road and practically all the mileage that year was made up of lines over 25 miles in length. This year we find that but one company built 100 miles of road, and but one other more than 50. Only six companies built more than 25 miles.

The proportion of new track built by old companies is surprisingly small. Only 10 of the companies building this year were in existence a few years ago, and the track built by these lines was hardly 180 miles, about 22 per cent. of the total built in the six months. It is rather noticeable, too, that the new road built by these old companies is, as a rule, properly included in the second group, into which we have classified the new mileage. That included under the third heading is almost all built by local companies of recent organization.

Of those lines which we have included under the first heading the Kansas City, Pittsburgh & Gulf comes first. This is not only the line of chief interest, in length of new road built, but also in its effect on existing routes of routes of traffic. The work done this year is in continuation of an ambitious project put under way in 1893 for a direct route between Kansas City and the Gulf of Mexico. Less than 200 miles of road now remains to be completed, and with the grading and tracklaying making rapid progress on the uncompleted sections the expectations of the officers to have the through line opened this year seem reasonable. The line is nearly a direct one of 770 miles from Kansas City to the new town of Port Arthur at deep water on the Gulf Coast near Sabine Pass. It is shorter by more than 100 miles than any existing route. But however important the line may become as a through route its greatest value will be in the development of large sections of Arkansas, Louisiana and Texas. The location for many miles in these states is through sections rich in natural resources, which have had no adequate railroad outlets. This traffic must prove remunerative, and, indeed, has already enabled the company to make one interest payment out of earnings.

All along the line, the development in anticipation of the building of the railroad, has been remarkable. New mines have been opened, great quantities of lumber have been cut by the mills, and the company secures a good traffic for each section of road as soon as it is opened for operation. Eighty miles south of Kansas City the line reaches a coal district, which has long had a considerable output, but which now secures a direct outlet, north and south; existing roads, traverse the region in east and west lines. Immediately south the line goes through the well-known lead and zinc districts of Southwest Missouri, of which Joplin is the center. The ores are smelted at Pittsburgh, Kan., in the coal district, and the company secures a long haul on raw materials in, and of the finished product out. The third section is through a fruit and grain-growing country, and extends to Fort Smith, Ark., which though on a branch is brought 80 miles nearer Kansas City. The next section, reaching Texarkana, brings that town 120 miles nearer Kansas City. The road here opens a country 270 miles wide, east and west, formerly without railroad communication. The line reaches another coal field, and goes through forests of white oak and pine, and mines of manganese, iron and other minerals. Further south, the line extends through cotton and rice-growing lands, and through immense forests of long leaf pine.

The more important of the other lines, which we have included as competing routes are the northern extension of the Lima Northern, 80 miles altogether; the Jackson extension of the Cincinnati, Jackson & Mackinaw; the extension of the Wisconsin Central to Lake Michigan, 28 miles, and the San Francisco & San Joaquin Valley road in California. The extension of the Wisconsin Central is built by one of its subsidiary companies, and gives the company a new eastern outlet, connecting with the Flint & Pere Marquette, by ferry across Lake Michigan, to Ludington. This gives a route of about 330 miles from St. Paul and Minneapolis to Lake Michigan, and a very direct route through to the seaboard. The road has just been opened, but the service across Lake Michigan to Ludington will not be in operation for service before fall. Connection will be effected in the meantime with other lines operating car ferries across Lake Michigan, and probably with boat lines to Buffalo or some other Lake Erie port.

The road built by the Lima Northern is practically a northern extension of the Ohio Southern, giving it an outlet to Northern Ohio and Michigan for the coal from the mines on the southern portion of its road. In 1892 and 1893 the Ohio Southern built 67 miles north of Springfield for this same purpose, and now

about 80 miles of additional road has been constructed. That it was needed has not been proved. It parallels the Cincinnati, Hamilton & Dayton, almost its entire distance, competes with it at many towns, and divides a traffic not any too large for one road.

The construction of the San Francisco & San Joaquin road is due to peculiar conditions in California, and the attitude of a section of the State of California toward the Southern Pacific, which we have previously referred to at some length. So far, nearly \$1,750,000 secured by subscriptions of business men and land owners in the San Joaquin Valley has been expended in surveys and in building about 90 miles of road south of Stockton, through a section at present served by three lines of the Southern Pacific.

The extension of the Cincinnati, Jackson & Mackinaw is but 18 miles long, and gives that company an entrance into Jackson, an important town. It was needed by the company, and would have been built some time ago but for the straitened condition of the treasury. The only other long line on which track has been laid this year is the Florida East Coast. Three years ago that company began extending its line south and has built nearly 200 miles of new road, as part of the plans of its President, Mr. H. M. Flagler, for developing the east coast of Florida and to reach the great hotels which he has built.

Now that railroads in this State are required to carry bicycles free, some of them are handling them very carelessly. The average baggage smasher is not delicate-fingered in any circumstances, and unless he receives special instructions is likely to toss bicycles about in a way not calculated to do them good. It looks like an attempt by these fellows to get even with the cyclists for securing the passage of the Armstrong law. The higher officials cannot approve any such action on the part of their subordinates.—*New York Tribune*.

We do not approve "tossing wheels about" and do not defend carelessness of any kind, but in connection with this item from the *Tribune* we cannot refrain from expressing a word of sympathy for the benefit of the General Baggage Agent who was recently remonstrated with for allowing bicycles to be piled upon trucks, the same as trunks, mail bags or theatrical scenery would be piled. "My goodness gracious!" said he (he did not use the ordinary railroad vocabulary), "what do you expect? Aren't they baggage? Hasn't the law made them baggage? What do we do with baggage? Pile it up in the car, of course. How otherwise can you put 50 bicycles into a common baggage car, in addition to the legitimate baggage? Does the law require us to put on an additional car, delaying the train on a busy day like the Fourth of July? When a passenger has a trunk that he wishes to have handled with special care, like a basket of eggs, he pays extra for the extra service; let the bicyclist do the same." It must be admitted that there are plausible grounds for this argument, and if our friend is willing to run the risk of the annoyance of a lot of petty damage suits no one can make very strenuous objection to his experiment with the New York law. New York City papers say that on the ferries across the Hudson River a dozen truckloads of bicycles are often seen on a single boat. Most of the business on these ferries is interstate, but the Erie and the West Shore take a good many wheels from New York City to points beyond New Jersey in New York State, and these come under the New York law. During the first two weeks of July it was estimated that 75,000 bicycles were carried out of New York by eight roads, as follows:

Erie.....	15,000
Central of New Jersey.....	12,000
Pennsylvania.....	10,000
New York Central.....	10,000
Delaware, Lackawanna & Western.....	9,000
West Shore.....	7,000
Lehigh Valley.....	7,000
New York, Ontario & Western.....	5,000
Total.....	75,000

On the New York Central and the New York, New Haven & Hartford roads suburban passengers bring their bicycles to New York, using them instead of cable cars or the elevated road to go to their places of business. These passengers pay about six or seven mills a mile for their tickets, but the wheelmen and law-makers doubtless believe that the railroads are getting enormously rich out of the business and need the extra bother of the wheels to keep down their pride. Quite likely the fact that the price of the ticket is very low will be used in the legislatures next Winter to show, not the injustice to the railroads of compelling the free carriage of bicycles, but the oppression of the passenger when a 15-cent charge is made; for is it not an outrage to charge, for a 15-mile ride, 50 per cent. more for a wheel than for its owner? In point of fact the cost may often be 100 per cent. or 1,000 per cent. more for carrying the wheel than for carrying the passenger; but facts do not always count.

According to the eighth annual report of the Statistician of the Interstate Commerce Commission, briefly summarized in another column, there was in the year ending June 30, 1895, "a decreased efficiency in passenger service and an increased efficiency in freight service" on the railroads of the United States. It seems to us that, as regards the passenger service, the use of the term

"efficiency" in this connection is misleading. The newspapers all over the country publish this assertion, but do not publish the figures on which it is based (and people would not study them much if they were published). What the statement means is that the average freight locomotive hauled 6 per cent. more freight than in 1894, while the average passenger locomotive hauled 16 per cent. less passengers; but the basis of efficiency is not the same in both cases. Every new freight engine is larger than the old one which it replaces; this raises the average power of all the engines and produces increased efficiency. But the efficiency of passenger trains is measured by their speed and frequency, not by tons of load, and in point of fact there was an increase here as well as in freight service. This cannot be accurately shown by Professor Adams' statistics, for they take no account of speed; but in frequency, as compared with the number of passengers, the increase is decided, the number of cars per million passengers being no less than 22 per cent. greater than in 1894. The number (frequency) of trains probably did not increase in anything like the same proportion, but from an economic standpoint—certainly from the railroad standpoint, which seems to have been the statistician's way of looking at it—the increase is nevertheless marked; that is, the railroads furnish more trains for the same money or the same number of trains for less money. To have made the new passenger engines (these, as well as the freight engines, are more powerful than the old ones that they superseded) more efficient, in the sense in which the report considers them, it would have been necessary to make the passengers travel in fewer trains; but this cannot be done where competition is sharp, and the scheme often defeats itself even where there is not much competition. If trains do not run at the hours when people want to ride they will stay at home. Professor Adams calls attention to the fact that the heavy travel to the World's Columbian Exposition raised the average passenger trainload in the first part of the fiscal year ending June 30, 1894. The comparison shows in a striking way how much more economically railroads could carry passengers if they would only consent to ride in trainloads.

Last May the Appellate Division of the Supreme Court of the State of New York rendered a decision which abruptly and completely stopped, for the time, the enterprise of building an underground railroad to serve the city of New York. The scope of that decision we gave at considerable length in our issue of May 29, page 376. Briefly, it forbade the Commission to go on because the cost of the plan was so great as to exhaust the borrowing powers of the city. At the time the decision was rendered another case was before the same court, which might have, or might not have, a still more important effect on the fortunes of the underground enterprise. That was a suit brought by the Sun Printing and Publishing Company, as a taxpayer, to restrain the commissioners and the officers of the city from a further prosecution of the scheme for building the rapid transit road, on the ground that the act under which the Commission is working is unconstitutional. A decision in this second suit was rendered on Tuesday of this week. The court declares the act valid, but a minority dissents; that is, Justices Barrett, Van Brunt and Williams hold that the act is constitutional, while Justices Ingraham and Rumsey hold that it is unconstitutional. We shall not take time this week to examine the text of the opinions, or to attempt any synopsis of them, but doubtless they involve some very interesting points of law.

The Post Office Department has arranged for an experimental mail service between Washington and New York with quick delivery. Letters may be mailed at the railroad station at Washington, Baltimore, Philadelphia and Jersey City up to five minutes before the time of the departure of the trains, and letters arriving at those cities will be held at the station by the transfer clerk for 30 minutes after the arrival of each train, so that addressees may call for them. At the end of half an hour the letters will be sent to the post office. From the announcements in the newspapers it seems that this special service is to be performed mostly on trains which do not have mail cars; that is, trains which carry only closed pouches. It will be tried on two trains each way on the Pennsylvania and one on the Baltimore & Ohio.

NEW PUBLICATIONS.

Railroad Law—We are in receipt of the Fifth Volume of Rapalje and Mack's Digest of Railroad Law, embracing the titles from "Employees" to "Intersection."

An examination of this volume shows it is quite up to the high grade of excellence attained by the preceding volumes, and all of the titles appear to have been well digested; but those which seem to be especially comprehensive and full are "Injuries to Employees," "Express Companies," "Fellow Servants," "Fires," "Flooding Lands," and the ever interesting and fruitful subject of "Injunctions."

The topic of "Injuries to Employees," has a number of cross references to other titles in the work, and is divided into seven heads relating to "Company's Duties Toward its Employees," "The Assumption of Risks of Employment," "Contributory Negligence of Employee," "Injuries to Infant Employees," "Injuries to the Employees of one Company by the Negligence of Another,"

"Remedies and Procedure" and "English and Canadian Statutes." The thoroughness of the digest on this subject may be inferred from the fact that it contains 784 sub-titles, each one of which contains a number of digested cases within itself, the whole article requiring 330 pages for its treatment. "The Doctrine of Estoppel," we may remark in passing, is also quite fully treated, and forms an interesting subject.

Evidence is divided into sub-heads of "Admissibility" and "Competency," "Judicial Notice," "Presumptions and Burden of Proof," "Best and Secondary Evidence," "Hearsay and Res Gestæ," "Parol Evidence," "Admissions and Declarations," and "Documents, Writings and Printed Matter," "Depositions and Testimony on Former Trial," "Weight and Sufficiency of Evidence." To this important title is devoted space in keeping with its importance, over 150 pages.

Under the head of "Explosions," is a number of interesting and novel cases, referring to the use of fog signals and torpedoes. The head of "Express Companies" treats of their rights and liabilities generally; their rights and liabilities as carriers, actions by and against them. The topic "Fellow Servants" is very fully digested, containing 506 sub-titles, with a number of cases digested under each of them, and is a small volume in itself. "Fires" constitutes a mine of information for the practical inquirer. It embraces, "Statutes of Several States on the Subject," "Companies' Negligence," "Contributory Negligence," "Remedies and Procedure." A large number of cases is collected and thoroughly digested. "Injunction" is treated under the following heads: "Granting the Writ," "Use of the Writ in Particular Cases," "Continuing and Dissolving," "Violation of the Writ," and "Injunction Bonds."

TECHNICAL.

Manufacturing and Business.

The Talmage Manufacturing Co., of Cleveland, O., on July 15, was incorporated with a capital stock of \$30,000. The company will deal in railroad supplies. The incorporators are J. E. French, W. C. Talmage, Allen Childs and W. H. Silverthorn, all of Cleveland.

The Union Car Works has recently enlarged its car wheel department at Depew, N. Y., increasing its capacity from 160 wheels a day to 250 wheels.

The A. B. Stone Construction Company is the name of a corporation recently incorporated in New York to do a general contracting business, especially in railroad building and the erection of buildings and railroad structures generally. The office of this concern is at 156 Fifth avenue, New York City. The officers are Andros B. Stone, President; C. F. Brown, Vice-President and General Manager, and Alvan L. Fowler, Secretary and Engineer. All these men are well known in railroad and engineering circles. Mr. Stone is the well-known veteran manufacturer, formerly of Cleveland, who made the first steel rails in this country from American metal, bringing workmen from England.

The Buckeye Malleable Iron & Coupler Co. has received orders through its general sales agents, C. H. McKibbin & Co., for Little Giant Buckeye couplers for 3,600 cars of the Express Coal Line of Georgia.

The Bloomsburg (Pa.) Car Co. has been reorganized. L. S. Wintersteen, having purchased G. M. Lockard's stock, has been elected President.

In the United States Court at Philadelphia last week Judge Acheson decided against the Union Switch & Signal Company in its suit asking for an injunction to restrain the Philadelphia & Reading and the Atlantic City railroads from using the fixtures and apparatus for an overlapping rail circuit, in connection with automatic signals, as furnished by the Hall Signal Company. The claim of plaintiff was that the Hall apparatus infringed patents owned by the Union Company, but the judge says that the question is so delicate and complicated that in the absence of more conclusive proof the court should refrain from undertaking to determine the rights of the parties. Therefore, the motions for injunctions are denied.

Iron and Steel.

The Malleable Iron Works, of Marion, Ind., made an assignment, on July 18, to John C. Tibbets, with liabilities of \$70,000. The works have been closed for an indefinite time.

Owing to lack of orders the billet mill and converter plant of the Illinois Steel Co., at Joliet, Ill., has been shut down for an indefinite period. Enough billets are on hand to keep the rod mills running for some time.

New Stations and Shops.

The Louisville & Nashville and the officers of the city of Nashville, Tenn., have failed to agree upon the terms of an ordinance relating to the proposed terminal changes, and the proposed new station at Nashville will not be built.

A new station has just been completed by the Pennsylvania at Elizabeth, N. J. The new building cost about \$40,000, and forms one part of the improvements made in connection with the elevation of its tracks through Elizabeth. The building is two stories high, the tracks being on a level with the second story, where the waiting rooms are situated, being reached from the ticket office on the first floor by means of an electric elevator.

Improving Boston Harbor.

Two contracts have been made by the Commonwealth for dredging parts of Boston harbor, under the act of

the last legislature, which appropriated \$150,000 for the purpose. Work under the first contract was begun on July 6, and under the second on July 13. The dredging work which the state is doing is independent of that done by the Government, yet it is in line with it. The two contracts just let require the dredging of the channels to a depth of 27 ft. at mean low water in front of the Mystic and Grand Junction wharves.

The cost of dredging in front of the Grand Junction wharves, East Boston, will be \$48,280, and calls for the completion of the work which was begun here last year. The areas to be dredged are in two parcels, lying between a line 50 ft. outside the harbor line and extending to the channel. The first area is opposite the Cunard wharf, and contains about 282,650 sq. ft. of surface and about 32,000 cu. yds. of material. The second area is opposite pier 7 of the Grand Junction wharves, and contains about 450,000 sq. ft. of surface and about 95,000 cu. yds. of material. The least present depth of water on the first area is about 21.3 ft. at mean low water, and the average cut is about 3 ft. On the second area the least depth is 9.4 ft. and the average cut is about 5½ ft. The work to be done in front of the Mystic wharves at Charlestown, is much more extensive. The area contains 1,041,000 sq. ft. of surface, and about 218,000 cu. yds. of material, and the contract figure for the work is \$89,225. The least present depth of water on the area is about 3 ft at mean low water and the average cut is about 5.2 ft.

The contracts call for the completion of all this work by July 1, 1897.

Production of Anthracite Coal.

A table is given in the *Engineering and Mining Journal* for July 18, comparing the production of anthracite coal in the United States for the first six months of 1894, 1895 and 1896. A considerable decline is shown for the total production of the six months, but the decline is most marked for the month of June, being 463,448 tons less than for that month in 1895 and 1,798,163 tons less than in 1894.

The table follows:

Month.	Production.		
	1896.	1895.	1894.
January.....	3,814,222	3,063,535	2,622,898
February.....	2,603,622	2,133,246	2,291,472
March.....	2,994,254	3,761,635	2,495,078
April.....	3,013,190	3,139,122	2,757,306
May.....	3,125,170	3,788,916	3,792,303
June.....	3,314,196	3,777,641	5,112,359
Total.....	18,898,654	20,664,158	19,072,306

Mississippi River Improvements.

Maj. Thomas Hanbury, in charge of the work on the Mississippi River between the mouth of the Missouri and the mouth of the Ohio, has made his annual report to the War Department at Washington. During the year the two snagboats, the H. G. Wright and the J. N. Macomb, have taken from the river 2,979 snags, cut 19,648 leaning trees and removed 11 drift piles. The Wright also removed the wreck of the steamer Hudson, which sank in the channel opposite Danklin's Bluff. The amount expended on this work during the fiscal year ending June 30, 1896, was \$80,395. The amount of money available for the continuance of the work in clearing the channel by use of the snagboats is \$100,000. Major Hanbury says that the object of improving the channel between St. Louis and Cairo is to obtain eventually a minimum depth at standard low water of 6 ft. from the mouth of the Missouri River to St. Louis, a distance of 16 miles, and of 8 ft. at the same stage of water from St. Louis to the mouth of the Ohio, a distance of 178 miles, the natural depth being in many cases from 3½ to 4 ft. The present project is a continuation of the plan adopted in 1881, and contemplates a reduction of the river to a width of 2,500 ft. below St. Louis, the natural width being in many cases from one to one and one-half miles. The method employed is the building up of new banks on the lines desired from the solid matter brought down by the river, and which is collected by means of hurdles.

The Reading Subway.

The contracts for the underpinning on Pennsylvania avenue, for the Philadelphia & Reading subway in Philadelphia, were awarded on July 21 to P. H. Flynn & Co., of Philadelphia, and E. D. Smith & Co., of Chicago. The contracts provide solely for underpinning the buildings along the line of the subway, which work must all be done before the bed of the street is removed. The work which will be done under these contracts includes all that west from Thirteenth street, at Callowhill, and the remodeling of the connection with the Reading Terminal. This will be done by Flynn & Co., who will also underpin all buildings on the north and south sides of Pennsylvania avenue, between Fifteenth and Sixteenth streets. The contract of Smith & Co. includes the underpinning and necessary alterations on both sides of Noble street, between Thirteenth and Broad streets, and on the south side of Pennsylvania avenue between Fifteenth and Sixteenth streets.

Two Electric Locomotives for Street Railroads.

The Canadian General Electric Company, at Peterboro, Ont., has been building a large electric locomotive rated at 400 H. P. The hauling capacity is about 15 loaded freight cars at the rate of 30 miles an hour. It is proposed to use this locomotive for hauling passenger and freight cars for the Hull Electric Company, between Hull and Aylmar. This is the first steam railroad in Canada to substitute electric power for steam. No results of tests have as yet been made public.

The Manufacturers' Street Railway Company, of New Haven, Conn., has purchased the electric locomotive ex-

hibited by the General Electric Company at the Chicago Exposition in 1893. This locomotive has a rated draw-bar pull of 7,000 lbs., the weight is 30 tons and will be used to haul freight cars nearly two miles of the road along the water front. The maximum grade is $2\frac{1}{2}$ per cent., and the guaranteed speed of the locomotive on this grade with a heavy load behind it is seven miles per hour.

A New Vessel for the Hamburg-American Line.

The Armenia, a large screw steamer for the Hamburg-American Steam Navigation Co., was recently launched from Palermo shipyard, at Yarrow-on-Tyne, England. The vessel will be rigged as a two-masted fore and aft schooner and is of the three-deck type. The main and upper decks are of steel sheathed in wood. A double bottom for water ballast is divided at the center line for the purpose of helping to trim the vessel. All modern apparatus and appliances for the most efficient and economical working are being fitted, and the whole vessel and machinery are being constructed to meet the requirements of the German emigrant service. The general dimensions are as follows: Length between perpendiculars, 406 ft.; beam, 50 ft.; depth molded, about 30 ft. 3 in. The engines will be four-crank quadruple expansion, with cylinders $22\frac{1}{2}$, 32, 47 and 68 in. x 51 in. stroke.

Test of the Justin Projectile.

The test on July 14 of the Justin high-explosive shell at West Vienna, on Onida Lake, N. Y., was satisfactory. Eight projectiles, weighing 100 lbs. apiece, and containing $4\frac{1}{2}$ lbs. of explosive gelatine, were fired from a 6-in. high-power breech-loading rifled gun. Five struck the lake at a distance of 4 miles and exploded under water, throwing a column of water high in the air. Two were fired at shorter range, timed to explode in one second, and were equally successful. One projectile was fired into a target of 2-in. Carnegie steel plate backed by 3 ft. of maple timbers and 6 ft. of sand. The shell pierced the armor and exploded in the wood backing, tearing out a large hole.

THE SCRAP HEAP.

Notes.

A show collision is announced to take place at Brighton Beach, Coney Island, N. Y., on Aug. 8.

The Railroad Commissioners of Iowa have notified the express companies doing business in that state to file copies of their tariffs with the Commission.

The Pittsburgh, Fort Wayne & Chicago has refused to accept the ordinance prepared by the city of Chicago for the elevation of its tracks between Fifty-first and Sixty-third streets. The formal objection is based on petty technicalities, so that the real reason for the road's attitude does not appear.

At Belvidere, N. J., July 21, the United States Pipe Line Company, a competitor of the Standard Oil Company, succeeded in laying a pipe beneath the track of the Pennsylvania Railroad early in the morning before the railroad officers were aware of what was going on. A few days later the Pennsylvania entered proceedings in court for ejectment.

The Pennsylvania and the Philadelphia & Reading are keeping up their warfare on the tramps. Near New Brunswick, N. J., one night last week five detectives arrested 63 vagrants. The Reading arrested a number of trespassers at Norristown. At Hurricane, W. Va., last Sunday, a conductor who attempted to put some tramps off his train was shot by one of them.

A Western paper reports that the employees of the Grand Rapids & Indiana Railroad have been warned against favoring the nomination of Mayor Pingree, of Detroit, for Governor of the State of Michigan. It is said that the following notice, signed by the Master Mechanic, has been posted at the car shops:

"Notice to Employees—The Republican caucus for the nomination of a candidate for Governor will be held next Monday. Before that caucus will come the name of H. S. Pingree, of Detroit. In case of his election he has openly made the statement that he is opposed to all railroads and other corporations as they exist to-day, and has declared his intention of bringing about a reduction in both freight and passenger rates, and of compelling increased taxes on all railroad property. We never dictate and do not now dictate to any employee how he shall vote, but allow him to use his own individual freedom. In case of Pingree's election the earnings of the railroads would be decreased and their expenses increased. The railroads not being willing to sustain the loss, it would necessitate a reduction in wages and force. The registration is open to-day and to-morrow. See to it that you are properly qualified to vote, and that you do not nominate a man who is opposed to your best interests."

Progress of Underground Work in Boston.

Up to July 11 there had been 5,951 ft. of trench opened, 75,065 ft. of conduit laid, 354,076 ft. of ducts put in, 204 manholes built, 428 service connections made from the mains of the different companies, and 17,155 ducts and 29 manholes in connection therewith.

Work of placing the wires in the subways is progressing rapidly.

Compensation for Carrying Mails on Street Railroads.

A committee consisting of Assistant Postmaster-General Neilson, Superintendent James E. White, and Assistant Superintendents L. T. Myers and J. M. Masten, has made a report to the Postmaster-General regarding the transportation of mails on street railroads.

The report states that in view of the varying motive power and the expense of running the roads, no compensation could be fixed which would be fair to all roads alike. It is estimated that 16 cents per car mile for postal cars 16 ft. in length is adequate compensation, with an increase of one cent a mile for each additional linear foot. For trailers, where no conductor or motor-

man is required, the committee would allow one-half cent per foot per car-mile for cars up to 18 ft. in length, and one-quarter cent per foot per car-mile for additional space. The committee recommends that the minimum compensation allowed street railroad companies shall be as follows: For lines performing 2,000 car-miles of service or less, \$150 per annum; for lines performing not more than 3,500 miles nor less than 2,000 miles, \$175; for lines performing not more than 5,000 miles nor less than 3,500 miles, \$200; and for lines performing not more than 8,333 miles nor less than 5,000 miles, \$250.

R. R. B. Letters on the Pennsylvania.

President George B. Roberts has issued an order calling attention to the recent circular from the Post-office Department concerning the transmission of railroad letters, in which he treats the whole of the lines owned or controlled by the Pennsylvania as a single "system." He enjoins strict compliance with the regulations of the Post-office Department and the acts of Congress governing the transmission of mail matter, and forbids the transmission by railroad service of letters or packages except "such as relate strictly to the business of the companies forming the Pennsylvania Railroad Company's system and then only between points on the lines of that system." He adds the following detailed instructions:

"First. Mail pertaining strictly to the business of the lines exchanged between officers and agents of the system and officers and agents of the Traffic Associations, of which lines in the system are members, may be carried."

"Second. Letters or packets containing manifest, bills of lading, freight tariffs and passenger rate sheets, loss and damage claims, tracers and junction car reports, exchanged between agents of the system and agents of other roads over which the traffic to which they relate passes, may be carried."

"Third. Consignments made by the Union News Company to their agents located on the system may be carried as per contract."

"Fourth. As the Union, Empire and Green lines are owned by and are a part of the system, their officers and agents will be governed by this circular, and the letters and packets bearing their marks will be treated as other railway mail, and subject to the same conditions."

Street Railroads Operated by Cities.

The Committee of the Common Council of the city of Milwaukee, which is investigating the question of municipal ownership of street railroads, has sent letters of inquiry to various English cities, and in the replies to these letters, which are published, we find some facts of interest. The committee reports that in Berlin, Budapest and certain British cities passengers are carried at two cents each with large profit to the company. The city of Bradford, England, built the street railroad tracks in that city and has leased the working of them to two companies until January, 1903. Agreements were made with the lessees before the tracks were laid. Steam locomotives are used on some of the lines; electricity is being considered, the city being the owner of an electric power plant. The City of Glasgow owns and operates extensive horse railroads. Electricity is being considered. The underground railroad in that city is not yet open for passenger traffic. The city of Huddersfield made a profit in the last fiscal year on its street railroads of £1,377, though the expenditures included £2,700 for relaying one line of track. In Huddersfield there are 19 miles of road, nearly all single track.

The receipts for the last year were: Fares, £26,926 17s. 3d.; parcels, £420 9s.; miscellaneous, £27 13s. 4d.; lost property, £36 14s. 1d. The number of passengers carried (allowing $1\frac{1}{2}$ as an average fare per passenger) amount to 4,308,289. The city has a contract with the postal authorities for the conveyance of postmen and telegraph messengers when on duty. The contract includes letter boxes attached to each tram car. The amount of the contract is £200 per annum. The letter boxes are a great public convenience and the number of letters posted in them are at the rate of 7,000 per week.

The city of Manchester has 54 miles of track which was laid by the city and is leased to a private company. There is a movement to have the roads operated by the city after the expiration of the lease.

The New Steamship Line to Canada.

The probable acceptance of the tender of the Allan Company for the Canadian mail contract is a somewhat unexpected development of the agitation for a new fast service between Great Britain and Canada. The Messrs. Allan have, according to the latest telegraphic intelligence, submitted the lowest and, in fact, almost the only suitable tender. The fastest vessel now running to Canada has an average steaming power of about 15 knots, and under the new contract this will be increased at a bound to about 20 knots an hour. No mail company—not even the Cunard or White Star—maintains an average of 20 knots with all its mail steamers, so that the new Canadian mail service if it comes up to contract speed will be carried out by the fastest steamers in the world, so far as the average speed goes. This is not too much to expect from the line that will receive the highest subsidy of any in the Atlantic. Neither the Cunard nor White Star, it may be remarked, receive subsidy. They are paid for their services as mail carriers according to the weight of the mail bags. And the amount which they receive for their work done from this side averages only about £500 a week. The American Line is paid a subsidy for every mile its steamers run, and if no voyages are missed in the course of the year, and no extra runs made, the American mail boats will receive a little over £150,000 a year. But the new Canadian service with £225,000 beats even this handsome subsidy, and it may not improbably lead to a demand for higher payment to the mail steamers between Queenstown and New York, with a promise of higher speed by way of equivalent. It is regarded as practically a certainty, now that the Allan Line has secured the contract, that their vessels will call at Moville. It was they who nearly 40 years ago made Moville a port of call for the Canadian liners, and with steamers calling at Moville under the new contract, Scotland and the North of Ireland will share in all the advantages of the accelerated service, while England will suffer no loss.—*Transport.*

Foreign Notes.

Since the Japanese administration has been established in the Island of Formosa there has been remarkable activity in material improvement. The British consul says that "more has been done in five months than the Chinese did in as many decades." Many long lines of 20-in. Decauville railroads have been built. One of these lines is 50 miles long and another 30 miles.

The Great Western Railway of England has recently ordered two new twin-screw steamers for the English Channel service. The length of the ships will be 280 ft.,

breadth, 34 ft. 4 in.; the depth, 16 ft. and the draft 11 ft. 4 in., with a displacement of 1,600 tons. The speed will be 20 knots.

The Russian Government, which is holding a great national exposition at Nijni-Novgorod, has made arrangements to take a large number of people from all parts of the empire to the exposition free of expense. The beneficiaries of this grant will be teachers, pupils and workmen in factories and industrial enterprises, and if the press reports may be depended upon, all people in these classes, scores of thousands, will enjoy the advantage described. They will not only receive free transportation, but will be cared for at the expense of the Government while staying at Nijni-Novgorod.

Show Collision at Chicago.

Mr. Streeter had his second collision near Chicago July 4, and says that he had 25,000 spectators at 75 cents each. The third was on the Illinois Central at 101st street, Chicago, July 25. The outside track of the yard at this point was used, it being fenced in with canvas for a distance of about one-quarter mile along the track. A similar wall of canvas was put up about 500 ft. back from the right-of-way line. The ends were enclosed in a similar manner, leaving openings at either end for the track used for the collision.

The trains consisted of old engines Nos. 1306 and 1374 and old freight cars. One was marked "Gold Standard" while the other was "Free Silver." Over the headlights of the engines were the portraits of the respective Presidential nominees. The engines were started when about a mile apart and met near the center of the inclosure; at the time they were running about 30 miles an hour. The wreck was complete, one engine being thrown on its side with the other on top of it, while the tenders and cars were piled up above the engines. The attendance was large.

The Jamaica Railroad Disaster.

Captain Weise, of the steamship America, which arrived at Baltimore, July 20, from Jamaica ports, brought details of the derailment on the new Jamaica Railroad, in which 17 persons lost their lives and 23 others were severely injured. The accident happened July 11, about 10 miles from Anato Bay. A locomotive drawing six flat cars, loaded with colored laborers, male and female, was descending a steep grade on the side of the mountain, when the speed got beyond control and the train shot down the steep grade like a rocket. Not realizing that the train was beyond control, the women clapped their hands with glee, and laughed and cheered as they flew over the rails. Near the bottom of the grade the runaway train collided with a locomotive which was standing on the track. Seven men jumped from the cars and were instantly killed, three being decapitated. Thirty-two others were more or less seriously injured, of which number 10 died afterward. None of the women was severely hurt.

LOCOMOTIVE BUILDING.

H. K. Porter & Co., of Pittsburgh, Pa., has lately received orders for two 15-in. x 20-in. Class "2-C-2" locomotives to be shipped to Johannesburg, South Africa. The company is also building light locomotives to be shipped to Hayti, Port of Spain, Trinidad, West Indies and San Salvador. Many valuable orders have been secured for compressed air motors of various types and classes. The shops are working to their full capacity.

The Dickson Manufacturing Co., of Scranton, Pa., has just completed a passenger engine arranged for burning anthracite culm. It is said to be the first culm-burning passenger locomotive built at these works. The engine has 68-in. driving wheels and a boiler 56 in. in diameter, with a steam pressure of 160 lbs. It is for the Delaware, Lackawanna & Western, and two other engines of similar type are being built at the Dickson Company's shops, and will also be used on the Morris & Essex division of the road.

CAR BUILDING.

The Grand Trunk is building at its St. Charles car shops, Montreal, 16 cars for the Pullman Car Company. Three of the cars have already been completed and will be placed in service immediately.

The shops of the Philadelphia & Reading at Reading, Pa., have an order for building 100 new hopper coal cars. Beside the new cars the shops are likely to be busy for a long time on repairs. The machinery department has been running 13 hours a day for several weeks.

The Barney & Smith Car Co., of Dayton, O., has about completed the cars for two passenger trains for the Cincinnati, Hamilton & Dayton. Each train will consist of a baggage car, two day coaches, a chair car and a sleeper. The cars will be used on the trains of the company between Cincinnati, Detroit and Mackinaw.

BRIDGE BUILDING.

Aberdeen, S. Dak.—Press reports state that the contract for three bridges over the James River has been given to the Gillette-Herzog Mfg. Co., Minneapolis, Minn., at \$3,775. Other bidders were J. G. Bullen, Ashton, S. Dak., \$3,875; Columbus (O.) Bridge Co., \$3,800; Groton (N. Y.) Bridge and Mfg. Co., \$3,829; King Bridge Co., Cleveland, O., \$3,719; Milwaukee (Wis.) Bridge and Iron Co., \$3,882; N. M. Start, Des Moines, Ia., \$3,848; Wisconsin Bridge Co., Milwaukee, \$3,750; Wrought Iron Bridge Co., Canton, O., \$3,621.

Annapolis, Md.—The Commissioners of Anne Arundell County have given a contract to the Groton Bridge and Mfg. Co. for an iron trestle bridge over Little Patuxent River for \$940.

Bedeque, P. E. I.—The local government will construct a bridge over Dunk River, between Murray's Island and Cowatt's shore. The distance is 1,250 feet.

Boston, Mass.—The Boston Transit Commission has awarded the contract for the ten masonry piers for the Charleston bridge to Perkins & White, Boston, at \$230,591. Other bids received were as follows: Thomas Dwyer, New York, \$313,000; E. W. Everson, Providence, R. I., \$290,000; Jones & Meehan, Jamaica Plain, Mass., \$375,000; Arthur McMullen & Co., New York, \$314,000; R. A. Malone & Co., Boston, \$286,000; Pigeon Hill Granite Co., Rockport, Mass., and Hiram W. Phillips, Quincy, Mass., \$386,310; Rogers, Farrell & Yates, New York, \$319,500; Bowe & Miller, Boston, \$237,744; Shailer & Schniglaue, Chicago, \$256,000; Stewart & McDermott, New York, \$290,000; Trumbull, Ryan & Co., Boston, \$309,000.

Cincinnati, O.—Bids will be received by the Hamilton County Commissioners until Aug. 12, for the sub-

structure of bridges over the Little Miami River and Mill Race at Newtown, Anderson township. John Breen is president of the board.

Des Moines, Ia.—Reports say that the following bids for the steel superstructure for a bridge at West Fifth street were received on July 18: J. R. Sheeley & Co., \$25,200; N. M. Stark & Co., Des Moines, \$25,570; Fair-Williams Bridge and Manufacturing Co., Ottumwa, Ia., \$26,555; Geo. E. King Bridge Co., Des Moines, \$24,944; Wrought Iron Bridge Co., Canton, O., \$25,673; King Bridge Co., Cleveland, O., \$25,041; Wisconsin Bridge Co., Milwaukee, \$26,140; Chicago Bridge and Iron Co., \$25,000; J. B. Marsh, \$25,295; J. H. Killman, \$19,100.

Easton, Pa.—Plans for the new one-span steel bridge to be built at Howell's in place of the one recently swept away, have been adopted by the County Commissioners. The new bridge will be 111 ft. long, with a 20-ft. roadway.

Hagerstown, Md.—The County Commissioners have awarded the contract to the Groton Bridge and Manufacturing Co., Groton, N. Y., for a steel bridge across the Little Tonoloway Creek, at Hancock, at \$649.

Washington and Alleghany County Commissioners have decided to build a new iron bridge across Siding Hill Creek, which divides the counties. The cost of the bridge will be divided equally between the two.

Langdon, S. Dak.—Bids for a bridge over Pembina River, at Fish Trap, were received, July 6, as follows: Chicago Bridge and Iron Co., \$1,575; Gillette-Herzog Mfg. Co., Minneapolis, Minn., \$1,462; Toledo (O.) Bridge Co., \$1,630; Wisconsin Bridge and Iron Co., Milwaukee, \$1,520. Gillette-Herzog Mfg. Co. received the contract.

Milwaukee, Wis.—Reports say that two steel arch bridges, 87-ft. span and 26-ft. roadway, estimated cost \$40,000, will be built over two ravines at Lake Park. Oscar Sanne is the Consulting Engineer.

New York.—James Howell, President of the Board of Trustees of the Brooklyn Bridge, has reported that plans for a bridge which shall be designed exclusively for railroad transportation, and which will connect this city and Brooklyn, are now under way. One plan will be for a four-track bridge, 45 ft. in width, and another for a six-track bridge, 60 ft. wide. The site suggested is some place just north of the present bridge.

Ottawa, Ont.—The Department of Railways and Canals has awarded the contract for the substructure of a bridge over Trent Canal, at Auburn, near Peterborough, to Larkin & Co., of Ste. Catharines. The work will cost from \$20,000 to \$25,000.

Pittsburgh, Pa.—Plans are being prepared for rebuilding the suspension bridge over the Monongahela River. E. M. Bigelow is Director of Public Works.

Roanoke Rapids, N. C.—The Roanoke Rapids Power Co. will rebuild, at once, a 275-ft. iron and steel bridge over the Roanoke River in place of the one recently washed away.

Savannah, Ga.—A railroad company formed to build a road from Savannah to Beaufort, S. C., will erect three iron bridges; one over the Savannah River at this place, one across the May River, and one across the Colterton River, both of the latter in Beaufort County, S. C.

Sloanville, N. Y.—It is proposed to build a 280-ft. single-span bridge over the Schoharie River at this place. Cost about \$10,000.

Sorel, Que.—The South Shore Railway Company contemplates building bridges over the Yamaska, Nicolet and St. Francis rivers this season.

Troy, O.—On July 17 bids for a high-truss iron bridge over Panther Creek were received as follows: Variety Iron Works, Cleveland, O., \$3,800; Oregonia (O.) Bridge Co., \$3,850; Canton (O.) Bridge Co., \$3,875; H. H. Baker, Mt. Vernon, O., \$4,000; Bellefontaine (O.) Bridge and Iron Co., \$3,821; Cincinnati (O.) Bridge Co., \$4,230 and \$3,995; Indiana Bridge Co., Muncie, Ind., \$4,070; Groton (N. Y.) Bridge and Manufacturing Co., \$3,895 and \$3,875; Penn Bridge Co., Beaver Falls, Pa., \$4,000 and \$4,100; F. J. P. Brackett Bridge Co., Cincinnati, O., \$3,810 and \$3,795; Toledo (O.) Bridge Co., \$3,962; Champion Bridge Co., Wilmington, O., \$3,795; Youngstown (O.) Bridge Co., \$3,680 and \$3,920; Iron Substructure Co., Columbus, O., \$4,260; King Bridge Co., Cleveland, O., \$3,890 and \$3,860; Hamilton (O.) Construction and Tool Co., \$3,925.75; Massillon (O.) Bridge Co., \$3,575, \$3,550, \$3,700, \$3,750 and \$3,000. The Massillon Bridge Co. was given the contract at \$3,700.

Utica, N. Y.—The contract for changing the machinery for operating lift bridges and for changing the lifting and fixed bridges, and for erecting two overhead foot bridges over the Erie Canal at Genesee street has been awarded by Superintendent Aldridge to the Havana Bridge Co., Montour Falls, at \$21,762.

West Chester, Pa.—The County Commissioners advertise for bids for new bridges in Chester County as follows: One over the Brandywine at Glen Moore, in Wallace township, to be of iron, with a 62-ft. span and a 16-ft. roadway. Another over Pickering Creek, at Anselma, in West Pikeland township, also of iron, with a 40-ft. span and a 16-ft. roadway. A third over Red Clay Creek, in the borough of Kennett Square, with a 40-ft. span, a 16-ft. roadway and a 4-ft. sidewalk.

Winnipeg, Man.—The Manitoba Government engineers have located sites for bridges over the Pembina and Souris rivers.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, St. Paul, Minneapolis & Omaha, 3½ per cent. on preferred stock, payable Aug. 30.

Cincinnati, Hamilton & Dayton, 1½ per cent. on preferred stock, payable Aug. 5.

Cornwall & Lebanon, 3 per cent., payable Aug. 1.

Lake Erie & Western, quarterly, 1¼ per cent. on preferred stock, payable Aug. 1.

Mahoning Coal, 3 per cent. on common stock, payable Aug. 1.

Rome, Watertown & Ogdensburg, 1¼ per cent. on the capital stock of the New York Central & Hudson River, payable Aug. 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Gray's Point Terminal Railway Co., special St. Louis, Mo., Aug. 21.

Wabash, annual, company's office, St. Louis, Mo., Sept. 8.

West Virginia & Pittsburgh, annual, Weston, W. Va., Aug. 11.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The American Association for the Advancement of Science will hold its forty-fifth annual meeting at Buffalo, N. Y., Aug. 22-29.

The Society for the Promotion of Engineering Education will hold its annual meeting at Buffalo, N. Y., Aug. 20-22.

The American Street Railway Association will hold its annual convention at St. Louis on Oct. 24 and 25.

The Roadmasters' Association of America will hold its next annual meeting at the Cataract Hotel, Niagara Falls, N. Y., beginning Sept. 8.

The Traveling Engineers' Association will hold its next annual meeting at Minneapolis, Minn., commencing Sept. 8.

The American Institute of Mining Engineers will hold its annual meeting in Denver, Col., beginning on Sept. 21.

The American Society of Railroad Superintendents will hold its next annual convention at Niagara Falls, N. Y., beginning Sept. 9.

The American Association of General Passenger Ticket Agents will hold its next annual convention at Atlantic City, N. J., beginning Sept. 15.

The Travelling Passenger Agents' Association will hold its next annual convention at St. Louis, Mo., beginning Sept. 29.

The American Railway Association will hold its next annual convention at New York City, beginning Oct. 7.

The Freight Claim Association will hold its next annual convention at The Jefferson, Richmond, Va., beginning Oct. 7.

The Association of Railway Superintendents of Bridges and Buildings will hold its annual meeting at Chicago on Oct. 20.

The Master Car & Locomotive Painters' Association will hold its annual meeting at the Park Avenue Hotel, New York City, beginning Sept. 9.

The National Association of Railway Contracting Freight Agents will hold its annual meeting at the Cadillac Hotel, Detroit, on Aug. 10.

The New England Roadmasters' Association will hold its annual meeting at Boston on Aug. 19 and 20.

New England Roadmasters' Association.

The fourteenth annual convention of the New England Roadmasters' Association will be held at Revere House, Boston, Aug. 19 and 20. The convention will open at 10:45 a. m. Aug. 19. The following questions will come up for discussion: "Elevation of Curves"; "Preparation Necessary and Best Method of Repairing Washouts; Faintnesses of Same"; "How Can We Secure Better Rail in Line, Surface and Quality?"; "Is an Automatic Switch Stand Desirable? How Can We Better Protect the Facing Switches?" Committees appointed by the Executive Committee will submit reports upon these questions. F. C. Stowell, of Ware, Mass., is Secretary pro tem.

PERSONAL.

—Mr. W. S. Wilson has resigned as Assistant Superintendent of the St. Louis division of the Illinois Central.

—Mr. J. P. Lyman, recently General Manager, has been elected President and General Manager of the Chicago, Hammond & Western.

—S. B. Wright, lately Private Secretary to President Ledyard, of the Michigan Central, has been promoted to be Assistant Purchasing Agent.

—Mr. P. T. Downs, Superintendent of Transportation of the Gulf, Colorado & Santa Fe, has received the appointment of Acting General Superintendent.

—Mr. W. H. Quigg has been appointed Division Freight Agent of the St. Louis Southwestern, with headquarters at Little Rock, Ark., succeeding Mr. A. R. Peyinghaus, resigned.

—Mr. W. A. Walden, of Charlotte, N. C., has been appointed Master Mechanic of the Southern Railway machine shops at Burlington, N. C., to succeed Mr. T. S. Inge, transferred to Columbia, S. C.

—Colonel L. J. Polk, General Freight Agent of the Gulf, Colorado & Santa Fe, has been appointed Acting General Manager to succeed Mr. B. F. Yoakum, now General Manager of the St. Louis and San Francisco.

—Mr. Howard F. Deverell, who has been with the Otis Steel Co. for some time, has been appointed General Western Agent of that company, with office in Chicago, succeeding Mr. S. W. McMunn, who has resigned.

—Mr. George Zoeller, for the past five years Superintendent of the Chattanooga division of the Pullman Palace Car Company, has resigned to enter other business. His successor is Mr. H. S. Twinnam, of Philadelphia.

—Mr. Nicholas Monsarrat has been elected Vice-President of the Columbus, Hocking Valley & Toledo road. Mr. Monsarrat has been recently President of the Columbus, Sandusky & Hocking road, resigning that office only last week.

—Mr. James Donohue, who recently resigned from the position of General Freight & Passenger Agent of the Kansas City, Pittsburg & Gulf, has been appointed Vice-President & General Manager of the Missouri Central road, recently organized in Missouri.

—Mr. J. H. French, Superintendent of the Cape Cod division of the Old Colony system of the New York, New Haven & Hartford, has been appointed Superintendent of its Plymouth division, with headquarters at Boston, to succeed Mr. J. C. Sanborn, resigned.

—Mr. J. M. Gruber, Superintendent of the Eastern Minnesota road, has been promoted to be General Superintendent of the Montana Central, with headquarters at Great Falls, Mont. He is succeeded on the Eastern Minnesota by J. B. Rice, of St. Paul, formerly Superintendent of the Fergus Falls division of the Great Northern.

—Mr. Edward S. Washburn, who has been acting as President of the Kansas City, Fort Scott & Memphis road since the death of Mr. George H. Nettleton early in the year, was formally elected to the office at a meeting of the directors of the company in Boston last week. Mr. Washburn will be President and General Manager, the title held by Mr. Nettleton, and the office of First Vice-President, which he has held since 1892, will probably be abolished. Mr. Washburn has been an officer of this company since 1891, having been appointed Freight Traffic Manager in December of that year. Previously he held a similar office on the Cleveland, Chicago & St. Louis.

—Mr. F. P. Olcott was elected President and Mr. J. H. Hill General Manager of the Galveston, Houston & Hen-

derson road in Texas at the recent annual meeting. Mr. Hill was appointed to this office some months ago, but has not yet been placed in active charge of the operation of the line, and which still continues under the direction of the operating department of the International & Great Northern. The present Board of Directors and officers were elected to represent the interests of the Missouri, Kansas & Texas, which owns the road, and the International & Great Northern, which has a long lease made some years ago, but through this representative Board of Directors was elected a year ago there has been some unexplained delay in transferring the property to the officers selected by it.

—Mr. W. W. Wheatly, Car Accountant of the West Shore road, has resigned that office, having been appointed Division Superintendent of the Brooklyn Heights Railroad Company. Mr. Wheatly became Car Accountant of the West Shore Railroad in 1890 upon the promotion of Mr. W. G. Wattson to be Division Superintendent. He has been connected with the company since 1884. Before his appointment as Car Accountant he had been Chief Train Dispatcher on the Buffalo Division at Syracuse. He is now about 38 years old. Mr. Wheatly has been an active and prominent member of the Car Accountants' Association, and has read papers at its meetings and those of the New York Railroad Club, and he has also contributed to the Railroad Gazette and other journals. Last February he was elected Secretary of the New York Railroad Club. With the development of electric railroad companies operating a large mileage, it has been noticeable that many officers of steam railroads have gone into the newer occupation. All the operating officers of the Brooklyn Heights Railroad, which controls 200 miles of electric railroad, were formerly in steam railroad service. The President, Mr. Clinton L. Rosier, was formerly Division Superintendent on the New York Central & Hudson River; Mr. Ira A. McCormack, the General Superintendent, was formerly on the Lake Shore & Michigan Southern and other lines.

—Mr. Robert Garrett, formerly President of the Baltimore & Ohio road, and the son of Mr. John W. Garrett, who built up the company, died at his home in Deer Park, Md., early on the morning of July 29. Mr. Garrett was born at Baltimore in 1847, and after graduation from Princeton University in 1867, and a short training in the banking house of his father, he was made President of the Valley road of Virginia in 1871. He became Third Vice-President of the Baltimore & Ohio in 1879, First Vice-President in 1881, and President in 1884 on the death of his father. One of the first acts of his administration was the construction of the Philadelphia Division and the attempt to get a direct entrance over the company's own road into New York City. That was a most costly undertaking, and twice as much as the estimates was spent in building to Philadelphia. The company's finances became seriously involved. Besides financing the Philadelphia extension, the company had to meet sinking fund requirements of \$750,000 a year. In addition to these drains on its resources, the company operated its own sleeping cars, and the express and telegraph business on all its lines. In March, 1886, it was announced that a syndicate had been formed to purchase 80,000 of the 150,000 shares of stock at between \$.75 and \$200 a share. This led up to the Ives incident. The syndicate could not carry out this contract and Mr. Garrett was induced to give another option to Henry S. Ives, but his firm was no more successful, and finally Mr. Garrett withdrew the option. This left the company's affairs in a critical condition, until a syndicate was formed by Mr. J. P. Morgan and others, who subscribed to consolidated mortgage bonds issued to pay off the indebtedness. In the same week the Baltimore & Ohio Express was sold to the United States Express Co. for \$2,500,000 and the telegraph lines to the Western Union Co., though Mr. Garrett opposed the sale. In October, 1887, he resigned the Presidency and Mr. Samuel Spencer became President. It became evident before his resignation that Mr. Garrett was losing his mind and the later years of his life were spent in retirement. Up to a few weeks ago he was in good physical health.

ELECTIONS AND APPOINTMENTS.

Black Water.—The new Board of Directors of this Vermont company is composed of C. A. Sinclair, of Portsmouth, N. H.; John Kimball, of Concord; John C. Pearson, of Penacook; W. W. Austin, H. H. Gerrish, C. D. Glitten and W. W. Burbank, of Webster.

Chicago, Rock Island & Pacific.—Mr. Wm. Gessler having resigned, Mr. A. L. Studer has been appointed Master Mechanic of the Southwest Division in charge of the Locomotive and Car Department, with headquarters at Trenton, Mo. Mr. J. B. Kilpatrick has been appointed Master Mechanic of the West Iowa Division in addition to his other duties as Master Mechanic of the K. & D. M. and D. M. & Ft. D. Division, with headquarters at Valley Junction, Ia.

Columbus, Hocking Valley & Toledo.—At a meeting of the Board of Directors held in New York City on July 18, the following officers were elected: N. Monsarrat, Vice President; Samuel D. Davis, Second Vice-President; Charles B. Alexander, Third Vice-President.

Columbus, Sandusky & Hocking.—The office of Car Accountant has been abolished. All reports of mileage and settlements are hereafter to be made with A. W. Dunning, Auditor and Assistant Treasurer. E. L. McCune has been appointed Real Estate Agent, in addition to his duties as Chief Clerk of the Maintenance of Way Department.

Fort Scott & Memphis.—At meetings of Boards of Directors of this company and the Kansas City, Memphis & Birmingham held in Boston, July 20, Mr. Edward S. Washburn was elected President to succeed the late President Nettleton. Mr. Washburn will also assume the duties of General Manager of the roads named and the associated lines.

Hancock & Calumet.—The annual meeting of the stockholders of the company was held at Hancock, Mich., last week. The following were chosen Directors: A. B. Eldredge, J. M. Wilkinson, C. H. Call and A. E. Miller, Marquette; W. E. Parnall, Calumet, and A. S. Bigelow, Boston.

Kansas City, Fort Scott & Gulf.—The following changes are to go into effect on this road on August 1: J. D. Riddle, now with the Kansas City, Memphis & Birmingham, to be Assistant General Freight Agent, with headquarters at Kansas City; F. C. Dumbek, General Freight Agent of the Chesapeake, Ohio & Southwestern, to be Assistant General Freight Agent, with headquarters in Kansas City. M. P. Washburn, at present Chairman of the Southeastern Mississippi Valley Freight Rate Committee, will succeed Mr. Riddle as Assistant

General Freight Agent of the Kansas City, Memphis & Birmingham.

Mobile & Birmingham.—At a meeting of the Directors held last week T. G. Bush, of Anniston, Ala., was re-elected President and General Manager and J. W. Spratley Secretary and Treasurer.

Pennsylvania.—Mr. E. A. Dawson has been appointed Manager of the Star Union line, succeeding Mr. D. S. Gray, the Pennsylvania's representative on the Board of Managers of the Joint Traffic Association. Mr. Dawson has been the Western Superintendent of the Union line, and will be succeeded by C. W. Forrester, General Southern Agent, from Louisville to Chicago. M. W. Hurley has been appointed General Southern Agent at Louisville.

Queen Anne's.—Stockholders of the Peninsular Construction Co. held their annual meeting at the office of the Guardian Security Trust and Deposit Co., Baltimore, on July 22. The construction company is building the Queen Anne's road. Directors for the ensuing year were elected as follows: Wesley M. Oler, Alexander Brown, Basil B. Gordon, Dr. Charles H. Tilghman, John S. Gittings, Henry C. Matthews, Douglas H. Gordon, John S. Gibbs, C. Lorraine Gill, George B. Baker, J. Southgate Yeaton and Frederick B. Hubbell.

St. Louis & Peoria.—Lewis H. Thomas, of Thomasville, Ill., and William B. Corneau, of Springfield, have been elected President and Secretary, respectively, of this new company. The incorporators are Thomas W. S. Kidd, Thomas C. Mather, William B. Corneau and Turney English, of Springfield, and Lewis H. Thomas, of Thomasville, Ill.

Union & Northeastern.—The incorporators of this company, organized at Farmerville, La., last week, are James M. Smith, J. D. Baughman, J. G. Trimble, C. H. Jameson, Abe Stein, W. P. Chandler, M. J. Pearson, James Manning, M. Haas, B. F. Pleasant and J. C. Montgomery, Farmerville, La.

White River Valley & Western.—The list of Directors of this new company in Arkansas is as follows: G. H. Candee, Lowell, Mass.; Dr. Egbert Guernsey, New York City; C. Babbidge, Brooklyn; G. P. Bassett, Cincinnati, O.; G. A. Haggerty, Nathan B. Williams, H. W. Whitlow, H. W. Cook and John Walker, of Fayetteville, Ark. Mr. Haggerty is President of the company.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Arkansas & Western.—Articles of incorporation of this company have been filed in Arkansas for a line in Clay County, beginning at a point on the St. Louis, Iron Mountain & Southern, within five miles of the Arkansas-Missouri state line, thence for about 40 miles to a point near the west central part of Randolph County. The company's office will be at Paragould. The capital stock is \$100,000, of which \$50,000 has been subscribed. The incorporators are S. B. Smith, A. M. Reynolds, W. D. Clark, W. C. Hasty and S. A. D. Eaton.

Astoria & Columbia River.—Honeyman, De Hart & Co., of Portland, Or., are reported to have the contract to complete this road between Astoria and Goble, Or.

Baltimore & Ohio.—Active work has been commenced on the Glenwood "cut-off" near Pittsburgh. A distinct company called the Glenwood Railroad was incorporated in Pennsylvania last week to build this new line, which will be but two miles long. Its construction will relieve the main line between Glenwood and Laughlin Station, a point where the Pittsburgh Junction road branches off through the city of Pittsburgh. The through Western trains on the Baltimore & Ohio now run over this line and the traffic is very heavy. The new line starts at Glenwood and follows the Monongahela River bank two miles to a connection with the Pittsburgh Junction tracks at Laughlin. The new line will be double tracked, and will be used by freight trains and through Western trains, the present main line being used only by passenger trains. In addition to the construction of the new road the company will enlarge its Glenwood yard. The present tracks accommodate but 500 freight cars, but with the new yard there will be room for 1,000 cars.

Bowling Green Northern.—This project, which has been under discussion a good many years, has been revived within the last month or two, and agents of the company are securing right of way and it is said are meeting with good success. The road is projected to extend from Bowling Green north to a connection with the Illinois Central, near Litchfield, Ky., about 50 miles. The building of the line would give Bowling Green and the section around it a new connection with Louisville over the Illinois Central, much shorter than the present route of the Louisville & Nashville. Col. M. H. Crump, of Bowling Green, Ky., is the active officer of the new company.

Canadian Pacific.—The extension of the Vaudreuil & Rigaud line to Ottawa is likely to be undertaken at once. The road is owned by the Montreal & Ottawa Co. The company's engineer, Mr. Hugh D. Lumsden, has been making preparations for some time past to build between Rigaud and a point near Alfred, a distance of 28 miles, and the whole section will be covered immediately by large gangs of men, as the Canadian Pacific officials desire to have the section completed by November. The new line after leaving Rigaud will pass through St. Eugene, Vankleek Hill and Caledonia Springs into Alfred.

Cincinnati, Hillsboro & Wellston.—The survey for this road through the counties east of Cincinnati, which has been going on for some time under the direction of Major P. M. Doyle, Chief Engineer, has now been practically completed, and the engineers are engaged in preparing the profiles and estimates. The road is to be built through Fayetteville and Milford to Hillsboro and Wellston, and when completed will form a direct connection between Cincinnati and the coal fields in Jackson County. It will also give an outlet to farming lands which at present have no railroad connection.

Kanona & Prattsburgh.—Plans are now being discussed for an extension of this road in Central New York north from Kanona to either Stanley or Pen Yan, N. Y., and on the south to Hornellsville, N. Y. Several routes are proposed for the northern extension, the line to Stanley being 25 miles long, with light grades, and that to Pen Yan, two miles less in distance, but involving some heavy grades. The latter is the more important town, and would give connections with the Northern Central and a branch of the Fall Brook Line. President A. E. Goddefrey is to visit Prattsburgh, N. Y., shortly, to confer with the business men of the town. A good deal of right of way has already been promised to the Superintendent and Engineer, Mr. J. G. Baker.

Kansas City, Pittsburgh & Gulf.—It is expected to have through trains running by Aug. 1 to Mena, Ark., nearly 376 miles south of Kansas City, and over 50 miles south of Poteau, I. T., the present terminus of regular trains. South of Mena the grading and track-laying is going on rapidly, the entire line being now under contract. On the 60 miles of road north of Horatio, Ark., which was recently awarded to Monroe & Lee, of Lawrence, Kan., who have had a number of other important contracts on the road, over 3,000 men are reported at work. This was the only important section of the road not under contract, and its completion will afford a connection at Horatio with the 120 miles of the Texarkana & Fort Smith Division of the line now completed and in operation. The work on this section from a point near the Arkansas & Indian Territory line to Horatio is the heaviest on the line of the road, being known as the Mountain Division. Some account of the work being done south of Shreveport is given below under the title, Kansas City, Shreveport & Gulf. There seems to be no doubt that the company will complete its through line from Kansas City to the Gulf coast by December. This will give a line of about 770 miles.

Kansas City, Shreveport & Gulf.—This road is building the Southern Division of the Kansas City, Pittsburgh & Gulf. The surveys for the line south of Shreveport have all been completed. The country is quite rough, the line generally crossing the drainage, going through Caddo, De Soto, Sabine, Vernon and Calcasieu parishes in Louisiana and Orange County in Texas. It reaches the towns of Frierson's Mill and Mansfield in De Soto; Many in Sabine and Leesville in Vernon. At a point about the center of Calcasieu Parish the route will diverge, one line going to Beaumont, and Port Arthur in Texas and the other line to Lake Charles, La. Contracts have all been let, and the work in Louisiana as far south as the northern line of Calcasieu Parish is well covered with men and teams. In Calcasieu Parish the work will be commenced about August 1st. Track has been laid from Shreveport to the crossing of the Texas & Pacific near Mansfield, 35 miles. The grading between Mansfield and Many is nearly completed and track will be laid at once. In Texas the work is all under contract and is being pushed. Track has been laid between Beaumont and Port Arthur, 30 miles. The principal contracts for grading are: Bernard Corrigan, of Kansas City; Quigley & Keough, of St. Louis; Smith & Co., of Kansas City, and Tansy Bros. Quigley & White have the contract for track laying; H. C. Lindsay, of Kansas City, has the contract for all piling and bridge work also water tanks and stations. The officers of the company are as follows: F. S. Hammond, General Manager; M. L. Scovell, General Agent, and A. W. Gloster of Shreveport, Special Assistant Engineer.

Lafayette.—This road is now completed and opened for traffic between Opelika and Lafayette, Ala., a distance of about 18 miles. The construction of the road was begun last year and about half of the tracklaying was completed before Jan. 1. The new line parallels a branch of the Central of Georgia for its entire distance.

Middle Tennessee & Alabama.—It is expected to complete the first division of 30 miles south of Fayetteville, Tenn., to Madison Cross Roads in Northern Alabama by Aug. 1. All of the track-laying between these points, except a few miles in Tennessee, is now completed. The second section from Madison Cross Roads, a station on the East Tennessee, Virginia & Georgia, near Huntsville, to Decatur, Ala., 23 miles, will be finished by October next. The projected line is from Decatur to Shelbyville, north of Fayetteville, and the grading between these points was practically all finished three years ago by the Decatur, Chesapeake & New Orleans road. The chief work so far done by the new company has been to surface up the old roadbed and to put down new ties on the portion on which the track has now been built. More than \$700,000 has been spent on the construction work, and, in addition to 40 miles of rails on hand, the new company came into possession of three locomotives and a number of platform cars.

Mississippi & La Fourche.—This road is being built from Landerdale, near Donaldsonville, to a point on Bayou La Fourche, 7½ miles, connecting with the Southern Pacific. R. W. Edwards is President.

Mississippi & Little Rock.—This company has been incorporated in Alabama by J. S. Greenwood, J. T. McKervy and others, to build a road in Monroe & Baldwin counties.

Montana.—The grading on this road, southeast of Helena, Mont., is now reported completed with the exception of the last 12 miles of grading to Castle. The line is about 40 miles in length and will give an outlet to Helena to the important mining districts at Castle. The rails for the line have been purchased, and it is expected that the tracklaying will be commenced some time this month.

New Roads.—Winston Brothers & Dear, of Minneapolis, Minn., are reported to have the contract for the new railroad between South Superior and Allouez Bay. The length of the line is about seven miles and surveys were recently completed by E. T. Abbott. It is not stated publicly what company is to build the line. The surveys in South Superior have been begun from a connection with the great Northern and current report has it that the line will be built at a branch of that road, giving it a connection with the Duluth & Winnipeg Terminal on Allouez Bay.

Norfolk, Willoughby Spit & Old Point.—This company, formed at Norfolk, Va., sometime ago, organized last week by the election of H. L. Page as President; I. A. Page, Vice-President and General Counsel; C. E. Norton, Secretary and Treasurer. The contracts were given out for building the company's road from the Ocean View terminus of the Norfolk & Ocean View road to Willoughby Spit and the completion of the Willoughby Spit pier. A steamer is also to be secured to run between Willoughby Spit, Old Point and Newport News.

Rio Grande Western.—Surveys are under way for a branch line from Proro, Utah, up the Proro Canyon to Heber, 27 miles, thence through Daniels' Canyon easterly to the Uintah Indian Reservation. At Heber a branch will be built, 10 miles north, to Park City. Work will be begun this season.

St. Louis & Peoria.—A charter has been granted this company to construct a road from Springfield to Peoria, Ill., through Sangamon, Menard, Mason and Tazewell counties. This company is believed to be a continuation of the old plan for an extension of the St. Louis & Chicago road.

Tennessee, Georgia & Atlantic.—The organization of this company, formed by the purchasers of the Marietta & North Georgia at foreclosure sale, is progressing, and recently articles of incorporation have been secured in Georgia. The incorporators are Edward A. Richards, of Boston and Atlanta; Alonzo B. Cornell, Henry M.

Blake, of New York City, and others. The charter provides for a line 243 miles long, from Chattanooga, Tenn., southeasterly across North Georgia, through Athens to Augusta. The Marietta & North Georgia road extends north from Marietta to Knoxville, Tenn., 200 miles. The capital stock of the new company is \$5,000,000.

West Virginia Central & Pittsburgh.—A number of officers of the engineering and executive departments of this company were reported by the press dispatches last week to have passed through Cumberland, Md., on a trip through Washington and Allegheny counties to go over the proposed route for an extension of this line. The project for an extension of this company beyond Cumberland to tidewater is one of some years standing and a company called the Baltimore & Cumberland has been organized by the officers to build this extension. The route of that line was to be along the Chesapeake & Ohio Canal, but by recent judicial decisions in Maryland that canal is to be continued as a waterway for a number of years, precluding the possibility of its use for railroad purposes within the terms. The present trip, which is being made by C. M. Hendley, Secretary of the Baltimore & Cumberland Railroad; S. E. Weir, Engineer of the company, among others, is taken to mean that an effort will now be made to secure another route for the eastern extension of the line which will be about 80 miles long.

Electric Railroad Construction.

Albany, N. Y.—The Common Council has granted a franchise to the Albany, Schoharie & Helderberg Railway Co., which proposes to build an electric road from Albany to Schoharie, a distance of about 30 miles.

Baltimore, Md.—The Baltimore County Commissioners at Towson, on July 22, agreed to report favorably upon the request of the Falls Road Electric Railway Co. for rights of way along certain public roads of the county. The road has already been given the right to lay its tracks on Falls road to Kelly avenue, about 2,500 ft. from Northern Central Railway Station.

On account of the great speed at which the cars are expected to run on the Columbia & Maryland Electric Railroad, the center pole construction will be used. They will be 34 ft. long and set 80 ft. apart. The wire will be suspended 18½ ft. above the rails. The trolley wire will be suspended from bracket arms of 2½ in. wrought iron pipe by special T-casting and a short length of pipe. The wire which will be used will be about three times heavier than that in service on the ordinary electric lines.

Buffalo, N. Y.—The Aldermen have passed a resolution granting a franchise to the Crostown Street Railway Co. to extend its lines on Jefferson street and Clinton streets, also on Elmwood avenue.

Cleveland, O.—The Northeastern Railway Co., of Cleveland, was incorporated at Columbus, July 20, with a capital stock of \$100,000, to build an electric line from the north of Euclid avenue, in Cleveland, to Hudson, Summit County.

Dayton, O.—A new company has been formed by the consolidation of the Wayne Avenue and the White Line Street Railway Cos., under the name of the People's Street Railway Co. Dr. J. E. Lowes and Hon. John A. McMahon, of Dayton, are officers of the new company. Capital stock, \$1,100,000.

Detroit, Mich.—The Detroit, Lake Shore & Mount Clemens Railway Co. has filed articles of incorporation at Lansing. The capital stock is \$300,000 in 3,000 shares of \$100 each. Construction work on the new road from Mount Clemens, along Lake St. Clair, and connecting with the Fort Wayne & Belle Isle and Detroit Railroads, will be begun in 30 days. Among the stockholders are: George S. Davis and F. T. Ranney, of Detroit, and Thomas B. Balch, of New York.

East Liverpool, O.—Surveys are now being made for a new electric road in East Liverpool.

Hackensack, N. J.—The Hackensack & Lodi Railway Co., has been organized to build 1½ miles of electric road in Hackensack.

Hagerstown, Md.—The Land Co. has granted the Hagerstown Electric Railway Co. right of way over the Boulevard from Poplar street to the pike.

Hamburg, N. Y.—The Armor Trolley Co. has been granted the right to enter Hamburg. It is proposed to build the line from Buffalo to Windsor, Armor, Hamburg, and a side line to Orchard Park and East Aurora.

Joliet, Ill.—The Joliet Electric Street Railway Co. has been reorganized with a capital stock of \$300,000. The lines will be extended and improvements will be made at once. The officers are: Jacob A. Henry, Joliet, President; George F. Duncan, Portland, Me., Vice-President; Henry O. Cox, Portland, Me., Treasurer; William B. McKenley, Chicago, Secretary and Manager.

Langhorne, Pa.—Surveys have been completed for an electric line between Langhorne and Frankfort, a distance of about five miles.

Manor, Pa.—The Greensburg, Jeannette & Pittsburgh Street Railway Co. has secured right of way from the Penn Gas Coal Co. through their property between Penn and Manor, and will begin work at once to complete the lines to Manor.

Philadelphia.—It is proposed to build an electric road from Philadelphia to Trenton, to run from Fox Chase, the terminus of one of the Union Traction Co.'s branch lines, across the country for a distance of about 23 miles to Trenton. An electric road is proposed from Frankford, to connect with the Fox Chase and Trenton line at Bustleton, to start at the terminus of the Union Traction Company's Frankford lines, at Bridge street, in Frankford. From that point it will run on the Bustleton and Somerston turnpike for a distance of nine miles through Sandiford.

Estimates are being received by Contractor Charles McCaul for a car barn for the Union Traction Co., with a front of 205 ft. 8 in. on Woodland avenue and a depth of 449 ft. on Forty-ninth street. The new structure is intended to take the place of the old depot at Twenty-fifth and South streets. The foundations of the new building are to be of stone and concrete, the walls of hardened bricks and the superstructure of iron. It is to be divided into two parts, each having spans of 103 ft., with 10 tracks in each section, capable of holding 240 cars. The roof is to be of corrugated galvanized iron.

Pittsburgh.—The United Traction Co., of Pittsburgh was chartered at Harrisburg, July 27, with a capital stock of \$15,000. Among the directors are: John Koebert, President; Wm. Francis and Wm. B. Armstrong.

This is the company that will control the Second avenue and the North Side Traction Co.'s when the two are consolidated.

Saginaw, Mich.—The Inter-Urban Railroad Co. has been granted a franchise to come into the city of Saginaw. It will cost the company \$300 a year to cross the Genesee avenue bridge.

Scranton, Pa.—The B. F. Shaw Co. has received the contract for refitting the power-house of the Scranton Traction Co. with steam heat and power apparatus.

Talcottville, Mass.—Surveys have been completed of the Rockville & Ellington Steel Railway Co.'s new line from Rockville to Talcottville. The engineers report that the route is a feasible one if the grade is considered.

Toledo, O.—Bids were received last week for laying the Perrysburg end of the new Toledo, Bowling Green & Fremont Electric Railroad.

West Roxbury, Mass.—The West Roxbury & Rosindale Street Railway Co. has petitioned for an increase of capital stock by the amount of \$50,000, and for an issue of bonds to the amount of \$150,000 for the purpose of building and equipping its road for electric power.

Worcester, Mass.—The Wachusett Mountain Electric Railroad, which was referred to in our issue of July 17, is designed to run from Worcester, through Holden Center, Jeffersonville, Eagleville, Ruralville, Princeton and South Westminster to Westminster Centre, there to intersect a new electric road running from Gardner to Fitchburg. It will be 19 miles in length on the main line and a spur will run from the main line at the base of Mount Wachusett up to the lower crown, reaching a broad plateau 1,600 ft. above the sea level. The company also propose to run a branch from the main line to Rutland Centre, a distance of four miles. They propose to have an electric light plant in the power-house for the purpose of lighting the entire length of the line. We are informed that the capital stock will be \$500,000. Col. Asa L. Kneeland, of Worcester, is Manager of the proposed road.

Zanesville, O.—The Zanesville Electric Street Railway Co. has been reorganized under the name of the Zanesville Street Railroad & Electric Co., with a capital stock of \$500,000. The capital stock of the road prior to the reorganization was \$300,000. Among the officers of the new company are John Hoge, President; W. H. Bateman, Vice-President; G. H. Stewart, Treasurer and H. R. Newkirk, General Manager.

GENERAL RAILROAD NEWS

California & Nevada.—Since this property passed into the control of Mr. C. K. King as Receiver and General Manager considerable improvements, both in the roadbed and in train service, have been made and plans have been formulated for additional improvements. The road is 22 miles long, extending from Oakland to Bryants. C. L. Receivers' certificates are being issued to carry out the repair work. Bridges are being renewed, the roadbed reggraded at certain points and the track levelled.

Carolina, Knoxville & Western.—This road was sold at Greenville, S. C., July 24, to J. L. Williams, Mayor of Greenville.

Chesapeake, Ohio & Southwestern.—The formal sale of this road took place at Louisville, Ky., on July 26 under foreclosure proceedings, and was bid in by representatives of the Illinois Central for \$1,500,000.

Columbus, Hocking Valley & Toledo.—The company has recently arranged to fund its floating debt, issuing \$382,000 general mortgage six per cent. gold bonds of 1904, making total amount outstanding \$2,000,000; also \$500,000 five per cent. non-cumulative five per cent. preferred stock, making total outstanding \$2,500,000. The officers have issued a financial statement showing that the surplus of earnings over expenses, interest and taxes for the year 1895 was \$70,856; the surplus of royalties after payment of interest on Ohio Land and Railway Co. bonds, \$19,600, a total of \$90,456. The net increase first five months of 1896 was \$126,168, so that for the year 1896, should there be no further increase, there will be a margin over all fixed charges, including interest on the Ohio Land and Railway Co. bonds, amounting to \$216,630. This is equivalent to over eight per cent. on the total issue of preferred stock. The estimated gross earnings for the six months ending June 30, 1896, were \$1,219,570, compared with \$1,052,188 for the same period last year, an increase of \$167,382, or 15 per cent., and the net earnings for the same period, one month partly estimated, were \$480,439, compared with \$347,513 for the same period of 1895, an increase of \$132,926, or 38 per cent.

Duluth & Winnipeg.—This road was sold on Monday of this week to the Reorganization Committee, which represents the interests of the Canadian Pacific, for \$2,374,717.

Northern Pacific.—The sale of the company's property took place at West Superior, Wis., on July 25, under order of Judge Jenkins of the United States Court, and was bid in by E. W. Winter, representing the new Northern Pacific Railroad. Mr. Winter bid \$10,000,000 for the first parcel, consisting of the main line and branches; \$2,000,000 for the second, consisting of stocks and bonds of branch lines held under the consolidated mortgage, and \$500,000 for the third parcel of contracts and leases of branch lines. There were no other bidders. After the first sale the company's lands in Wisconsin were offered at the County Court House, Mr. Winter, as before, bidding them in and offering \$575,000 for them. This week the lands in the other states are being sold and bid in.

St. Louis, Avoyelles & South-Western.—The Louisiana courts have reversed the order made late in June appointing Hugh J. Fitch, of New York City, Receiver of this property under proceedings brought by the banking firm of J. & W. Seligman & Co., of New York. The judge who made the original order concurred in the reversal. The President of the company, Mr. P. M. Welch, who was not made a party to the original proceedings, brought action to have the order appointing the Receiver vacated, and this was granted apparently on the ground that the notice to the railroad company was not sufficient. The road is about 40 miles long, in Avoyelles Parish in Central Louisiana.

Electric Railroad News.

Chicago.—The West and South Chicago Street Railway Cos., of Chicago, have agreed to a consolidation with the Chicago General Railway Co., the name of the new road to be known as the Chicago General Railway Co.

On July 18 the car sheds of the Chicago City Railway Co. were entirely consumed by fire, together with 554 cars, 160 of which were grip cars. Loss, \$500,000; insurance, \$311,000. Ten firemen were injured and about 20 horses burned to death.

Gardner, Mass.—The Railroad Commissioners have granted the Gardner Electric Street Railway Co. permission to issue \$50,000 stock to defray cost of equipping the road with electricity and \$30,000 six per cent. 20 year bonds for funding the floating debt.

Hagerstown, Md.—The Hagerstown Railway Co. has given a mortgage for \$200,000, covering all the property of the railroad company, to the Commonwealth Guarantee, Trust and Safe Deposit Co., of Harrisburg, Pa.

Pittsburgh, Pa.—The stockholders of the Pleasant Valley line have voted to lease its lines to the Northside Street Railway Co., at an annual rental of \$70,000 for 990 years. This will insure a yearly dividend of 5 per cent. on the \$1,400,000 worth of capital stock, the par value of which is \$25. The Northside Co. expects to lease the Manchester line in a few weeks. Among the new Board of Directors is H. J. Bowdoin, of Baltimore; W. V. Callery and M. K. McMullen, of Pittsburgh.

Sacramento, Cal.—All the property and interests of the Folsom Water Power Co. and the Sacramento Electric Power & Light Co. have been conveyed to the Sacramento Gas & Railway Co., which was recently incorporated. The ownership will remain the same, but there will be but one company.

St. Louis.—The total number of passengers carried by the street railroad lines in St. Louis for April, May and June, amounted to 30,293,214; a gain of 3,472,131 over the corresponding three months of last year.

TRAFFIC.

Traffic Notes.

The Chicago Great Western will soon build a grain elevator at North First street, Kansas City, to have a capacity of 1,000,000 bushels.

Philadelphia papers state that on Saturday and Sunday last 50,000 people were carried by rail from that city to Atlantic City. The Pennsylvania and the Baltimore & Ohio have brought to Atlantic City many trainloads of passengers from as far west as Pittsburgh and beyond.

The San Joaquin Valley has reduced the rates on wheat from points on its road to Stockton, San Francisco and all important points. On the opening of the San Joaquin Valley the Southern Pacific made a reduction to Stockton only, but the San Joaquin Valley has now made an arrangement with a steamboat line carrying freight between Stockton and ports on San Francisco Bay and thus makes rates through. From Merced to San Francisco the rate is \$2 20 a ton.

The Southern Pacific (rail) line between Portland and San Francisco and the steamship line of the Oregon Railway & Navigation Company have restored the passenger rates between these cities which have been on a very low basis since last October. On the day before the restoration both lines did a very heavy business; extra trains were run and the boats were crowded. The regular rates now in effect are \$19 first class, including sleeping-car berth and \$10 second class, by rail; \$12 cabin and \$6 steerage, by boat. The reduced rates were about one-half these figures.

The Chicago, Rock Island & Pacific has taken off eight suburban trains between Chicago and Blue Island. It is said that this is on account of the competition of the Chicago & Northern Pacific, which, to meet the competition of electric lines, recently reduced the fare to a large number of suburban stations to one uniform rate of five cents. A Washington paper says that the Pennsylvania has taken off nearly all its local passenger trains between that city and Alexandria, Va., an electric road having been established which runs cars every hour.

The Executive Board of the Southern States Freight Association has recommended a reduction of 80 per cent. on practically all classes of freight from Eastern points to Atlanta to meet the competition of the Seaboard Air Line, but at this writing no official announcement of the establishment of these very low rates has appeared. The State Railroad Commissioners of North Carolina and of Georgia have notified the railroads that if low interstate rates are put into effect orders will be issued for the immediate reduction of freight rates within the states named. An injunction has been issued restraining all of the railroads from using or acting on the very low rates lately announced, as noted in another column of this paper.

The people of the Central States—or the reporters, at least—are still mourning because the managers of the Joint Traffic Association have "killed their excursion business." An excursion of the Big Four from Indianapolis to Niagara Falls last week is said to have been a failure, though the number of passengers carried is not stated. The rate was \$10, whereas last year the rate for a similar trip was \$5. The Lake Erie & Western, not a member of the Joint Traffic Association, is to run an excursion to the Falls at \$6 25, passengers going by boat from Sandusky to Buffalo. The Iowa Central announces an excursion from Iowa points on Aug. 5 at half rates to Peoria and \$8.75, round trip, from Peoria to the Falls. This is over the Lake Erie & Western, and presumably by boat on Lake Erie, though the item from which we take the news gives no light on this point.

The Chicago agents of the transatlantic steamship companies have received notices that hereafter, in selling tickets to be used by emigrants coming from Europe, they must sell through to the final destination. Eighteen of the principal steamship lines have agreed to this arrangement, with a view to "preventing delay and expense at immigrant landing stations." The circular states that passengers are now frequently held by the immigration authorities as liable to become public charges, because they have not tickets through to destination or sufficient money to purchase them. The new rule will prevent the deportation and exclusion from the United States of deserving people, whose relations or friends cannot be readily found because of remoteness of residence, temporary absence, loss of address, etc. The immigration laws of the United States offer a ready means of control, as passengers before embarkation must declare their final destination in America and state whether they hold a through ticket to such destination. The circular adds that the routing of westbound passengers will be determined by the steamship companies "with due regard to the convenience of the passengers."

The Presidents of the Pennsylvania, the Baltimore & Ohio, the Chesapeake & Ohio, the New York Central and the Norfolk & Western met in Philadelphia last week and agreed to correct numerous irregularities in the rates on bituminous coal, which, it is said, have crept in during the past month or two. The bituminous coal trade has been in a bad condition for some time. There has been little demand for this variety of coal. The coal operators in the early part of the year formed an associa-

tion for their own protection, and it included all the operators in the soft coal districts of Pennsylvania, Virginia, West Virginia and Maryland. When this association was completed coal prices were advanced, and for a time everything was harmonious. Early in the spring the usual custom of making contracts for the ensuing year was begun. The railroad companies of the New England States have heretofore been large purchasers of bituminous coal, but when they received the bids from operators who were members of the association, they refused to entertain them and threatened to purchase the coal from Nova Scotia if the prices were not reduced. This action of the New England roads created considerable agitation among the coal men, and for a time it looked as if there would be a break, but the matter was taken in hand by the stronger members and the bids were not changed. The Eastern roads were firm in their decision, and up to the present time have not given any large orders for bituminous coal. The consequence of this has been that there is a great amount of soft coal mined and stored at the various yards of the different companies.

Chicago Traffic Matters.

CHICAGO, July 29, 1896.

The fight for the Southwestern grain traffic is getting very warm. The Chicago lines are determined to stop the diversion to the South, and the roads leading to the Gulf are just as determined to hold the traffic. On July 24 the Chicago Great Western announced a proportional rate of 12 cents on wheat and flour, and 10 cents on corn, Missouri River points to Chicago; to Dubuque, wheat 8 cents, corn 6 cents; to St. Paul, wheat 14 cents, corn 11 cents, and to Minneapolis, wheat 11½ cents and corn the same. In addition to this the same road has reduced the flat rate to 15 cents on wheat and flour from Missouri and Iowa points to Chicago, with 12 cents on corn and oats. Other Chicago roads say they will not meet the Great Western because of the unimportance of the latter line as a grain carrier. The Kansas City, Ft. Scott & Memphis has reduced the wheat rate Kansas City to New Orleans to 12 cents and the corn tariff to 10 cents, and the grain rate generally from Kansas City to Memphis to 10 cents. At the reduced rates more than 4,000 cars of grain have been bought and contracted for by Chicago buyers at Kansas City. With the recent reductions to the Gulf it will now require a reduction to 8 cents to move any more grain to Chicago. A meeting of the executive officers of the warring lines will be held in Chicago or St. Louis this week to consider the situation, but the situation is changing daily, and the result of the meeting is problematical. The Chicago Great Western and the Atchison, Topeka & Santa Fe have to-day announced a flat rate of 9 cents on all grain, Kansas City to Chicago. The large purchases of corn in Kansas and Nebraska have produced unwonted activity at shipping points. The yield of corn this year promises to be large, and the farmers have at last decided to sell their old corn without restraint.

Lake rates so far this season have been unusually well maintained. The lowest the corn rate has gone has been 1 cent a bushel to Buffalo, and the high mark has been 2 cents. The volume of traffic to date has not been so heavy as last year, but for some time now the business is likely to show a heavy increase over last year by reason of the low proportional rail and lake traffic recently put in effect by the Western roads on oats from the Mississippi. These tariffs quote 3 cents per 100 lbs. from the river on lake business, and 4 cents on that going East by rail.

Many grain vessels have cleared from Chicago with half a load or no load at all, to be chartered at Milwaukee and the ports to the north at higher rates than could be got from here. The lake and rail agreement has had a very good influence on lake rates this season.

It has been discovered by officers of the Central Passenger Committee that the Baltimore & Ohio and the Nickel Plate have been for several weeks manipulating first-class passenger rates between Cleveland and Chicago. The scheme was to recognize orders of scalpers for any 10 persons at the party rate. Just before the deal was discovered the two roads were accepting scalpers' orders for tickets at the reduced party rate for single passengers. By the arrangement the rate between Cleveland and Chicago was cut from \$8.50 to \$5, and even lower. The scheme was worked on only westbound business. Both roads have now stopped the irregularity.

The Cincinnati, Hamilton & Dayton has announced that it will accept the mileage books of the New York, Chicago & St. Louis and the Toledo, St. Louis and Kansas City. While this is a break in the interchangeable mileage agreement it is not believed the break will extend any further. When the Cincinnati, Hamilton & Dayton went into this agreement it reserved the right to withdraw on 10 days' notice.

The roads of the Western Passenger Association have entered into an agreement providing that hereafter joint action will be necessary to run week-end or Sunday excursions in competitive territory. This, it is thought, will have the effect of greatly curtailing these affairs, which are unprofitable and (with the better classes) unpopular.

When the Illinois Central begins to run its St. Louis trains via the Big Four, Aug. 1, it will put in service two through daily express trains between Chicago and St. Louis, one day and one night.

Total shipments from Chicago to the East last week by lake amounted to 72,181 tons, of which 66,118 tons were grain. Total all-rail shipments East, exclusive of live stock, amounted to 46,454 tons, compared with 52,740 tons for the preceding week, a decrease of 6,286 tons, and against 41,644 tons for the corresponding week of last year. (Last week's all-rail decrease is accounted for by the fact that the major part of the oats now go east by lake.) The proportions carried by each road were as follows:

Roads.	WEEK TO JULY 25.		WEEK TO JULY 18.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	4,921	10.6	5,270	10
Wabash.....	5,213	11.2	5,460	10.3
Lake Shore & Mich. South.	5,885	12.7	6,291	11.9
Pitts., Ft. Wayne & Chicago	6,181	13.3	6,786	12.9
Pitts., Cin., Chi. & St. Louis.	5,414	11.6	5,225	9.9
Baltimore & Ohio.....	5,101	11	4,396	8.5
Chicago & Grand Trunk.....	4,770	10.3	6,923	13.1
New York, Chi. & St. Louis.	3,853	8.3	5,173	9.8
Erie.....	3,961	8.5	5,513	10.4
C., C. & St. Louis.....	1,142	2.5	1,679	3.4
Totals.....	46,454	100.0	52,740	100.0

Of the above shipments 5,663 tons were flour, 11,451 tons grain, 10,153 tons cured meats and 9,670 tons dressed beef.